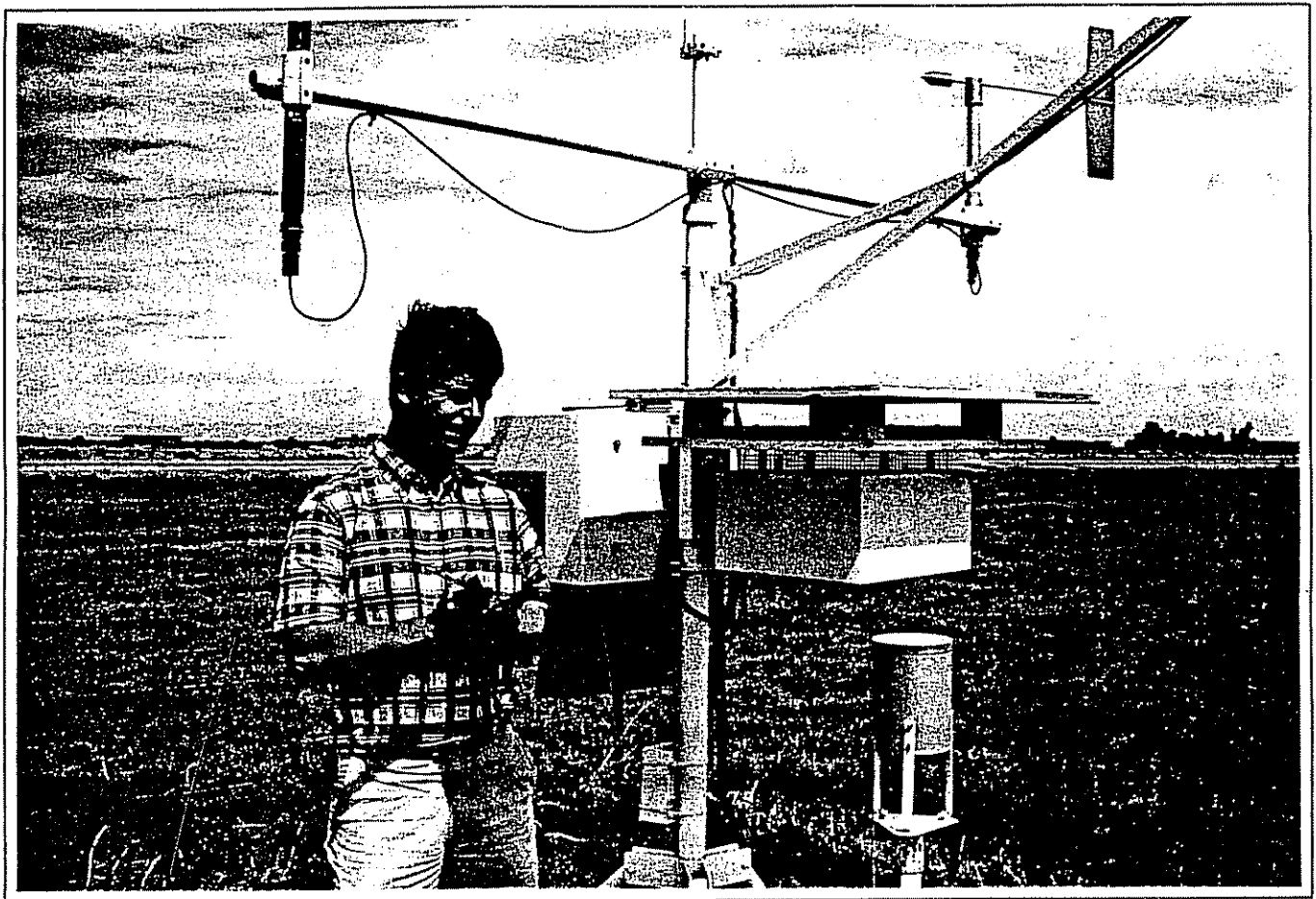


03-1

# WATER CONSERVATION ACTIVITIES

## 1986

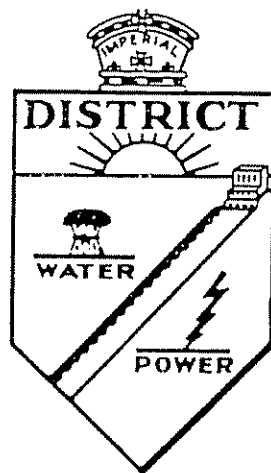


# IMPERIAL IRRIGATION DISTRICT

IMPERIAL IRRIGATION DISTRICT

1986

WATER CONSERVATION ACTIVITIES



## EXECUTIVE SUMMARY

As proposed in the Imperial Irrigation District's (District) 1985 Water Conservation Plan, an update of water conservation activities has been prepared.

Brief summaries are given of the progress and status of the several conservation programs included in the 1986 calendar year budget, reports on activities relating to water conservation for the period January 1 through December 31, 1986, by the District Board of Directors, the Water Conservation Advisory Board, and the Water Conservation Task Group; a record of the engineering work and other consulting services performed for the District by Parsons Water Resources, Inc. (Parsons); and District staff activities.

Section 1 of this report updates records maintained by the District through 1986. These include.

- (1) Historic Use of Colorado River Water by Four First-Three-Priority Agricultural Users
- (2) Consumptive Use of Lower Colorado River Mainstream Water
- (3) Flows Below Parker Dam and Below Yuma Main Spill
- (4) Weighted Monthly Salinities at Selected Colorado River Stations
- (5) All-American Canal Distribution
- (6) Imperial Irrigation District Water Delivered to Users
- (7) Water Deliveries to Cities and Towns
- (8) Inflow to Salton Sea
- (9) Salton Sea Evaporation
- (10) Summary of Salt Balance

Flows from the Colorado River continued above average for the fourth consecutive year during 1986. Total flow in the Colorado River for calendar year 1986 was 18.0 million acre-feet (MAF), according to United States Geological Survey's Provisional Records.

Historic Colorado River Diversions were not presented in the 1985 Water Conservation Plan. In this update, use of Colorado River water by the first three priority agricultural users, including IID, for the 27-year period through 1986 are presented in Section 1. The last year that such use exceeded the "allowable" 3.85 MAF was 1979, although 1981 was only slightly below. For the 27-year period, agricultural use exceeded 3.85 MAF in 10 years. During the last five years, agricultural use has been the lowest for this 27-year period.

The Colorado River Board monthly reports include records of consumptive use of Lower Colorado River Mainstream Water, i.e., net diversions by all users in Nevada, Arizona and California. Annual Lower Colorado River consumptive use for the past five years, including total arrivals to Mexico, varied from 5.4 to 6.2 MAF.

High flows have resulted in lower salinity in Colorado River water. Weighted monthly salinity during 1986 at Imperial Dam averaged 580 ppm compared to the 1974-1978 average of 844 ppm. District diversions at Imperial Dam into the All American Canal totalled 2,700,545 acre-feet (AF) for 1986. "Consumptive Use of Colorado River Mainstream Water" by the District, as prescribed in Arizona vs. California dated March 9, 1964, was 2,692,789 AF after return flow credits.

Deliveries to users within the District for 1986 were 2,336,583 AF, compared to 2,335,297 AF in 1984. Municipalities received only 27,058 AF in 1986.

Total cropped acreage for 1986 was 512,328, including 58,008 multiple-cropped acres. Alfalfa continues to dominate acreage with 43 percent of the total.

The elevation of the Salton Sea on December 30, 1986, was -226.80 feet. This is a drop in elevation of 0.05 feet from the same time one year earlier.

For the 35th straight year a favorable salt balance has been achieved within Imperial Valley. Salt inflow from the Colorado River via the All American Canal totalled about 1.82 million tons in 1986. District drains discharged 2.84 million tons of salt into the Salton Sea.

Total water revenues plus net interest income for 1986 totalled \$23,152,709. Expenditures exceeded income by \$6,878,902.

The District Board of Directors has taken numerous actions related to water conservation planning and programs during 1986. The major actions following presentation to the Board of the draft 1985 Water Conservation Plan on January 22, 1985, included the following:

- (1) The acceptance of the reports by Parsons Water Resources entitled Water Requirements and Water Availability Study and Water Transfer Study, and Environmental Impact Report; (December 2, 1986).
- (2) Adoption of the 1986 budget which included \$6.5 million for water conservation programs.

The Water Conservation Advisory Board met regularly during 1986. This body is comprised of local water users. Major actions performed included:

- (1) Review and discussion of tailwater recovery program, first year report, including field tour at Veysey Ranch.
- (2) Development of Incentive Program Report.
- (3) Passed Resolution No. 86-1.
- (4) Review of CIMIS - 12-hour run.

The in-house Water Conservation Task Group, following preparation of the draft 1985 Water Conservation Plan, continued to review and respond to comments submitted by interested parties, and to edit and prepare the final plan. During the year the Task Group reviewed the progress on the 1985 programs. Exhibit 3, contains notes on meetings held from June 10, 1985 through October 30, 1986. Highlights of activities reported and discussed at these meetings are as follows:

- (1) Implemented the Demonstration Tailwater Recovery Program. As of April 30, 1986, five tailwater recovery systems had been installed and were in operation.
- (2) Deploying Water measuring equipment for various programs, including purchasing, testing, and installing electronic recorders.
- (3) Grant and Loan applications.
- (4) USBR/IID Cooperative Studies.
- (5) Coordination with Parsons Water Resources.

- (6) Special studies: Lateral Fluctuation, Modified Demand, Irrigation Scheduling, etc.).
- (7) Preparation of 1987 budget.
- (8) Review of progress on all water conservation programs, including concrete lining and tailwater monitoring.

To aid the District in the development and implementation of specific water conservation plans several engineering firms were invited to make presentations. The Ralph M. Parsons Company (Parsons) was selected from the six national firms responding.

A Letter of Intent was executed on April 19, 1985, which set forth the terms and conditions for a definitive water conservation planning and development agreement between the District and Parsons.

The intent of the letter was that the District and Parsons would cooperatively undertake a program that would (1) quantify the District's present and future water needs, (2) determine the additional water that might be available for use by others and identify the potential transferees thereof, and (3) provide for the planning, engineering, designing, financing, construction and implementation of the water conservation and transfer programs (collectively referred to as the "Program").

On May 17, 1985, the District Board of Directors authorized Parsons to proceed with initial studies. Seven major areas were to be studied and developed.

- (1) Program Management, Control, and Administration.
- (2) Program Procedures.
- (3) Water Requirements and Availability Study.
- (4) Water Transfer Study.
- (5) Water Conservation Implementation Plan.
- (6) Program Studies and Reports.
- (7) Program Support Services (As required).

The "Water Requirements and Availability Study" was designed to quantify the District's present and future water needs. Additional water that could be made available to others was then to be determined.

The findings of the study are:

- (1) The District's share of its allocated water as part of the Seven-Party Agreement will be available with greater than 99 percent certainty through the year 2010.
- (2) Current baseline water demand within the District is 2,770,000 AF/year.
- (3) With no conservation measures the baseline water demand will increase to 3 MAF/year by the year 2010.
- (4) An estimated 138,000 AF/year of water has been conserved. New projects could conserve an additional 358,000 AF/year.
- (5) There are 700,000 AF of groundwater available of which 300,000 AF/year can be retrieved at a cost of \$32,000,000.
- (6) The estimated capital cost for the post-1985 conservation program is \$600,360,000, including \$335,000,000 for a desalination plant.

(7) A potential 496,000 AF/year can be conserved.

The "Water Transfer Study" identifies potential water transfer candidates within the State of California.

Conclusions drawn were that:

- (1) Water conservation will ensure that the IID's water availability is increased by conserving 500,000 AF/year and transferring only 250,000 AF/year.
- (2) Reduction of the current level of the Salton Sea, by reducing losses and, therefore, inflow to the Sea will reduce penalty payments by the existing high sea level.
- (3) Overall, there will be local and regional economic benefits from conservation expenditures, lower farm production costs and the inflow of money from outside sources for operation and maintenance of the irrigation systems, and payment of costs for environmental mitigation measures.
- (4) Water demand in Southern California will continue to increase.
- (5) Diversion of Colorado River water to Central Arizona will impact Southern California.
- (6) California laws support transfer of conserved water.
- (7) Transfer of conserved water from the District is feasible.
- (8) The coastal plain of Southern California incorporates the most appropriate transferees.

- (9) The MWD, San Diego County Water Authority and Kern County are the most likely transferees.
- (10) Conserved water from the District is the most attractive source because of location and cost.

The need arose to develop a Program Environmental Impact Report (EIR) for the implementation of water conservation projects designed to conserve up to 500,000 AF/year of water and the transfer of 250,000 AF/year of present District water allocations. A Focused EIR was also to be prepared for the potential transfer of 100,000 AF/year of water already conserved.

Seventeen consulting firms were invited to submit proposals for the two EIRs. On December 10, 1985, the Board of Directors selected Parsons Water Resources to prepare the Program and Focused EIRs. On December 2, 1986, the Final EIR was approved by the Board. The major impacts from water conservation measures are as follows:

- (1) The first 100,000 AF/year of water transferred would not have any significant environmental effect because this water has already been conserved and is not entering the IID's system.
- (2) Water conservation will ensure that the IID's water availability is increased by conserving 500,000 AF/year and transferring only 250,000 AF/year.
- (3) Reduction of the current level of the Salton Sea, by reducing losses and, therefore, inflow to the Sea will reduce penalty payments by the existing high sea level.

(4) Overall, there will be local and regional economic benefits from conservation expenditures, lower farm production costs and the inflow of money from outside sources from operation and maintenance of the irrigation systems, and payment of costs for environmental mitigation measures.

The District has developed methodology to determine water conserved by concrete lining. The following is a summary of the work done in 1986:

Canal	Length (Miles)	Water Conserved (AF/Year)
Wistaria Canal	1.43	221
Trifolium Extension	1.34	170
Dandelion	1.11	121
Rockwood Lateral 8	0.5	50
Rockwood	1.86	307
Dogwood Lateral 2	0.4 (pipeline)	50
Birch P-2 Canal	0.19 (pipeline)	9

Cummulative annual water savings resulting from the concrete lining program through 1985 are estimated by the task group to be about 60,000 AF/year.

Operation and maintenance of the seepage recovery system along the East Highline Canal allowed 15,072 AF of water to be conserved. A Parsons study estimated an annual recovery rate of 8,000 AF at the All-American Canal between Drop 3 and Allison Check by seepage recovery pumps.

Operation of four regulating reservoirs resulted in the diversion of 110,894 AF during 1986. It is estimated that 15,000 to 25,000 AF is conserved per year.

Two reservoirs are currently in the planning stages, Trifolium Extension and "Z" Reservoirs.

The Trifolium Reservoir was one of the four projects for which a loan application was submitted to the Department of Water Resources (DWR). Design work is complete, a Negative Declaration has been prepared, and land has been acquired. As a related project, a 1.34-mile section of the Trifolium Extension Canal was concrete lined earlier this year.

Under the Clean Water Bond Law of 1984, the District submitted an application for a loan to finance water conservation programs. The California Department of Water Resources (DWR), the bond coordinator, announced on May 7, 1986, that the District was one of seven applicants whose proposals would receive further review. Among the projects proposed by the District are:

Project	Amount Requested	B/C Ratio
Trifolium Reservoir	\$1,600,000	3.80:1
Spill Interceptor	670,000	4.17:1
Concrete Lining South Alamo Canal	680,000	3.48:1
Concrete Lining Program	2,050,000	2.27:1

"Z" Reservoir was submitted for funding consideration under the Water Conservation and Water Quality Act of 1986. DWR is also implementing this program. Final project selection has not been announced.

Tailwater Monitoring continued under the same 13- and 21-Point Program rules previously in effect. A total of \$201,586 was assessed in 1986.

The USBR/IID Cooperative Study designated "Concrete Lining and System Improvement Study" has been conducted in accordance with the three-year agreement between the Bureau and the District. A memorandum of a staff-level meeting held between the Bureau and the District is included as Exhibit 6.

Extensive metering at measurement stations has been made and historical water-flow records have been entered into computer files for the East Highline Canal in cooperation with the United States Bureau of Reclamation.

Electronic Recorders have been investigated to reduce the amount of labor required to monitor and report water flows. A unit utilizing a float and potentiometer was selected. This type of electronic recorder is being used on two District laterals as part of the lateral fluctuation study. The goal of the program is to identify structural problems and operational procedures which cause fluctuations in flow, resulting in variable deliveries to water users. This study will also be used to calibrate an irrigation system computer model developed by Parsons.

Operational discharge is being determined under a random sampling program of the 241 spill locations; 30 sites are being sampled on a continuous basis

using electronic recorders. Yearly spill estimates have been determined and an operational discharge reduction plan will be prepared. Total operational spill for 1986 is estimated at 104,579 AF.

Annual reports to provide estimates of the total tile drain discharge have been prepared. Refer to Table 14. This is a part of the leaching requirements study as well as contributing to an understanding of water balance within the District. The total tile discharge for the period August 1984 to May 1985, is estimated to be between 246,000 AF and 267,000 AF.

An experimental 12-hour delivery program was started in the Holtville Division on October 8, 1986 for a 45-day period. This delivery program was for seed germination only. Computer incompatibility, vehicle and man-hour overtime and canal fluctuations are problems encountered to date.

The District has completed four years of research on developing methods of controlling hydrilla in the waterway system. Research conducted in cooperation with Coachella Valley Water District has demonstrated the economical and effective use of triploid grass carp to consume aquatic vegetation. The District is currently using a variety of this fish called the "triploid" grass carp because it is assumed to be sterile, thereby reducing the concern of overpopulating District canals, thus having a negative impact on other resident fish, such as the largemouth bass, channel catfish, flathead catfish, and bluegill.

A fish hatchery is currently in the planning stage for the production of the triploid grass carp.

Five demonstration Tailwater recovery systems - "pumpbacks" - were installed on during 1985-86.

The purpose of this program is to determine the effectiveness, potential problems and associated costs of tailwater recovery systems on different soils, slopes, crops, etc. Delivery, tailwater, recycled tailwater, water salinity, soil salinity, and temperature are being monitored.

Preliminary data shows that a substantial amount of tailwater can be conserved using these systems. Projections show that annual savings are in the range of 1 AF of water per cultivated acre.

The Irrigation Scheduling Program was reduced to 10,000 acres in 1986. Theoretically, irrigation scheduling could be the major, and possibly only on-farm program needed to conserve water. The program in its various forms, is intended to provide the farmer with data to show how much water to apply and when. With proper irrigation application techniques up to 100,000 AF of water per year could be conserved.

This Report presents a listing and description of the various components of the District's continuing water conservation programs being undertaken in accordance with the 1985 Water Conservation Plan. Until outside funding is available, it is recommended that the current level of effort in water conservation continue with emphasis on expanding and improving the data base, planning, and construction of physical works such as concrete lining.

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IMPERIAL IRRIGATION DISTRICT  
1986 WATER CONSERVATION  
ACTIVITIES

SECTION 1

1. INTRODUCTION

1.1 SCOPE

This report provides an update of water conservation activities and other matters relating to the District's 1985 Water Conservation Plan (Plan).

Brief summaries are given of the progress and status of the several conservation programs included in the 1986 calendar year budget report on activities relating to water conservation for the period January 1, through December 31, 1986, by the District Board of Directors, the Water Conservation Advisory Board, and the Water Conservation Task Group, a record of the engineering work and other consulting services performed for the District by Parsons Water Resources, Inc. (Parsons), and District activities.

1.2 OVERVIEW

A draft of the Plan was submitted to the Board of Directors on January 22, 1985 at which time the Board approved distribution of the draft to all interested parties for a 60-day review period.

The 1985 Water Conservation Plan stated that it was a general plan to improve facilities for for District and on-farm irrigation facilities

as well as nonstructural systems and procedures - administrative, operation, maintenance, ordering, scheduling, recordkeeping, etc. It was also recommended that the Plan should be reviewed annually by the Board of Directors and modified as conditions change.

The Board of Directors of Imperial Irrigation District adopted Resolution No. 19-85 on August 13, 1985 accepting the 1985 Water Conservation Plan (Plan) as the official plan of the District. The Plan was prepared by an in-house Water Conservation Task Group, with review by District staff and outside consultants.

Accordingly, the report herein prepared by the Water Conservation Task Group and designated Water Conservation Plan, Report for 1986, is in compliance with the latter recommendation.

### 1.3 REFERENCE MATERIAL

Chapter II of the 1985 Water Conservation Plan presented historic records generally through calendar year 1984, with some records through 1983 only. Reference is made to the District's 1985 and 1986 Water Report which is available for public review.

#### Colorado River

Table 11.3 in the 1985 Water Conservation Plan listed Annual Natural Flow of the Colorado River at Lee Ferry (Compact Point) for Water Years 1964 through 1983.

Colorado River runoff continued above average for the third consecutive year during 1985 and 1986. The United States Geological Survey (USGS) provisional records <sup>1/</sup> for the same calendar years reported 17.0 MAF and 18.5 MAF, respectively.

Historic Colorado River Diversions were not presented in the 1985 Water Conservation Plan. In this update, use of Colorado River water by the first three priority agricultural users, including IID, for the 27-year period through 1986 are presented as shown in Table 1. The last year that such use exceeded the "allowable" 3.85 MAF was 1979, although 1981 was only slightly below. For the 27-year period shown the agricultural users exceeded 3.85 MAF in 10 years. During the last four years, agricultural use has been the lowest for this 27-year period.

Colorado River Board monthly reports include records of consumptive use of Lower Colorado River Mainstream Water, i.e., net diversions by all users in Nevada, Arizona and California. Table 2, presents Lower Colorado River Consumptive Use for the past four years, including total, scheduled and excess arrivals to Mexico.

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<sup>1/</sup> The sum of monthly provisional reports from the USGS, Lower Colorado River Diversions and Return flows.

Table 1  
Historic Use of Colorado River Water by Four  
First-Three-Priority Agricultural Users  
(Acre-Feet)

YEAR	CVWD	IID	PVID	YPRD	TOTAL
1960	505,830	3,059,750	392,760	44,800	4,003,140
1961	521,650	3,036,000	388,550	39,660	3,985,860
1962	564,740	3,006,130	381,180	46,370	3,998,420
1963	537,640	3,062,490	367,230	45,300	4,012,660
1964	511,080	2,807,670	400,740	49,510	3,769,000
1965	514,760	2,688,150	349,400	44,080	3,596,390
1966	480,040	2,886,370	406,600	52,550	3,825,560
1967	455,950	2,769,590	364,130	48,180	3,637,850
1968	473,490	2,864,170	393,090	58,040	3,788,790
1969	486,000	2,714,480	390,780	60,390	3,651,650
1970	443,160	2,809,750	409,040	51,060	3,713,010
1971	466,170	2,938,790	465,300	48,880	3,919,140
1972	501,040	2,903,490	435,850	46,540	3,886,920
1973	511,690	3,008,680	474,670	47,850	4,042,890
1974	551,540	3,133,060	457,310	44,480	4,186,390
1975	566,300	3,046,910	451,340	46,040	4,110,590
1976	516,160	2,831,440	387,350	47,170	3,782,120
1977	498,550	2,717,190	430,880	40,800	3,687,420
1978	501,370	2,715,000	424,830	45,450	3,686,650
1979	523,370	2,843,730	462,310	48,680	3,878,090
1980	526,260	2,817,120	409,170	40,300	3,792,850
1981	447,200	2,839,490	518,090	40,890	3,845,670
1982	419,540	2,565,490	456,280	41,020	3,482,330
1983	355,340	2,509,280	322,370	20,050	3,207,040
1984	358,530	2,687,120	331,690	16,490	3,393,830
1985	336,060	2,678,390	387,190	18,170	3,419,810
1986	341,630	2,692,789	403,640	32,520	3,470,570
AVGES.	478,337	2,838,241	409,695	43,158	3,769,431

Data taken from Colorado River Board of California Water Reports, except for the Yuma Project Reservation Division (YPRD) for the years after 1981. The 1982-and-on CRB Water Reports take into account seepage from the All-American Canal in determining YPRD uses. The above 1982-and-on YPRD values are based on the 1960-1981 method of reporting YPRD uses.

TABLE 2

Consumptive Use of Lower Colorado River Mainstream Water  
and Excess Arrivals to Mexico

California Users	Acre-Feet			
	1983	1984	1985	1986
Palo Verde Irrig. Dist.	322,370	331,690	387,190	403,640
Yuma Proj. (Res. Div.) <u>b/</u>	36,130	36,390	40,960	32,520
Imperial Irrig. Dist. <u>a/</u>	2,509,280	2,687,120	2,678,390	2,692,780
Coachella Val. Wat. Dist. <u>a/</u>	355,340	358,530	336,060	341,630
(Subtotal)	(3,223,120)	(3,413,730)	(3,442,600)	(3,470,570)
Fort Mojave Ind. Res. <u>c/</u>	24,760	24,760	24,760	24,760
Cal. Miscellaneous	34,000	34,000	34,000	34,000
Metropolitan Water Dist.	902,810	231,140	268,600	1,298,370
Total	4,184,690	4,703,630	4,769,960	4,827,700
<u>Arizona Users</u>				
Central Arizona Project	0	0	33,490	109,900
Colorado River Ind. Res. <u>e/</u>	277,860	299,460 <u>g</u>	311,670	311,740
Gila Gravity Main Canal	465,350	527,990	550,510	590,480
Yuma Proj. (Valley Div.)	168,720	177,850	191,310	177,600
Fort Mojave Ind. Res. <u>c/</u>	85,130	85,130	85,130	85,130
Havas Nat. Wildlife Ref.	22,220	41,730 <u>f</u>	38,830	38,230
Arizona Miscellaneous <u>d/</u>	85,000	85,000	85,000	85,000
Total	1,104,280	1,217,160	1,295,940	1,398,080
<u>Nevada Users</u>				
From Lake Mead <u>b/</u>	91,140	98,540	104,300	112,200
Mohave Steam Plant	14,680	15,250	6,250	13,480
Total	105,820	113,790	110,550	125,680
Total Consumptive Use (Ariz., Cal., Nev.)	5,394,790	6,034,580	6,176,450	6,351,460
<u>Mexico Arrivals</u>				
Total Arrivals to Mexico	14,368,813	15,668,632	11,942,028	10,923,781
Scheduled Flow	1,700,000	1,700,000	1,700,000	1,700,000
Excess Arrivals	12,668,813	13,969,632	10,242,028	9,223,781

See notes on following page.

Notes: (for Table 2):

- a/ Based on measurements below Pilot Knob assumed to be equal to USBR Article V data after credit is given for unmeasured California return flows between Imperial Dam and Pilot Knob.
- b/ Return flow estimates based on averages of past returns as calculated by USBR for Article V data.
- c/ Assumed equal to December 1983 use estimated by Fort Mojave Tribe.
- d/ An estimated residual made by the Colorado River Board of California lumping together such items as small diversions along the river, unmeasured groundwater return flow, etc., which, when combined with other quantities listed to arrive at the State's Total, presents an estimate of the State's consumptive use of Lower Colorado River water.
- e/ Includes an estimated quantity of small diversions made directly from the river downstream of Headgate Rock Dam.
- f/ Flooding during 1983 and 1984 has rendered definition of consumptive use by HNWR vague. Hence, data for 1982 are being used for 1983 and 1984.
- g/ November data changed from 6,560 to 12,170.

Total Colorado River reservoir storage at the end of each of the last four years has been as follows:

Year	Acre-feet
1983	55,519,000
1984	54,680,000
1985	53,953,000
1986	54,568,000

Source: Colorado River Board monthly water reports.

These figures represent about 90 percent of maximum storage capacity, and exclude dead storage, but include about 16 maf of storage below minimum operating levels. At the end of July 1983, total storage reached an unprecedented 62.0 maf, 103 percent of capacity.

Flows in the Colorado River during the past six years have been abnormally high as shown below.

Year	Flows below Parker		Flows below Yuma Main Spill	
	Maximum	Minimum	Maximum	Minimum
1981	17,700	1,860	3,050	479
1982	17,100	1,760	2,180	482
1983	40,500	2,010	31,300	558
1984	33,200	23,100	19,200	9,030
1985	26,900	12,300	19,700	2,700
1986	32,900	9,090	18,500	1,930
Flows in cfs				
Source: Annual Water Reports of District Water Department.				

These high flows and full reservoirs currently allow for unlimited diversions by even the lowest priority users.

Salinity levels at Imperial Dam averaged 580 ppm for 1986, compared to the 1974-1978 average of 844. Table 3 presents the weighted monthly salinity record at five stations for 1985 and 1986 compared to the 1974-1978 five-year averages.

Diversions for the District from the Colorado River at Imperial Dam into the All-American Canal (Station 60) were 2,717,806 AF in 1985 and 1986. Allowing for return-flow credit in conformance with Article V of the Decree of the U.S. Supreme Court (Arizona vs. California) dated March 9, 1964, the District was charged with "consumptive use of Colorado River Mainstream water" of 2,678,381 Af in 1985 and 2,692,789 in 1986. In addition, 3,659,836 AF of water was diverted for the Pilot Knob power plant during 1985, and 3,337,157 in 1986.

Table 4 shows All-American Canal Annual Distribution of water for 1984, 1985 and 1986.

Monthly and cumulative amounts of water delivered to users from 1984 through 1986 are given in Table 5. Deliveries in 1985 of 2,335,247 AF were about the same as in 1984, and the trend in 1986 appears to follow these two previous years.

Deliveries of water by the District to the ten cities and communities in the service area are shown in Table 6. Average annual per capita use of 0.33 AF is indicated. The lowest use is in Heber (0.11 AF/person) with El Centro (0.25) and Calexico (0.28) also having below average per capita consumption. Assuming an average family size of four, average annual residential water use would be about 1.3 AF.

TABLE 3

WEIGHTED MONTHLY SALINITIES AT  
SELECTED COLORADO RIVER STATIONS<sup>1/</sup>  
(in parts per million)

Month	Below Hoover Dam		Below Parker Dam		Palo Verde Canal Near Blythe		At Imperial Dam		At Northerly International Boundary	
	5-Year		5-Year		5-Year		5-Year		5-Year	
	Avg. 2/ 1974-78	1985:1986	Avg. 2/ 1974-78	1985:1986	Avg. 2/ 1974-78	1985:1986	Avg. 2/ 1974-78	1985:1986	Avg. 2/ 1974-78	1985:1986
Jan.	690	564	515	709	601	500	913	627	1,041	612
Feb.	675	530	548	706	610	548	835	582	998	623
March	684	579	556	699	583	556	805	590	925	616
April	680	520	552	700	584	552	801	564	892	572
May	677	510	540	698	595	540	822	571	962	688
June	678	470	534	695	601	534	812	557	956	616
July	682	538	551	688	581	551	797	589	909	734
August	690		552	686	567	552	800	599	907	598
Sept.	672		548	686	546	548	815	582	952	621
Oct.	680	529	542	689	541	542	854	578	952	615
Nov.	682	504	546	692	562	546	897	588	1,070	632
Dec.	681	534	554	702	554	554	877	583	1,010	629
								599	999	615

## General Notes:

<sup>1/</sup> Salinities based on "sum of constituents"

<sup>2/</sup> 5-Year averages are arithmetic

TABLE 4  
IMPERIAL IRRIGATION DISTRICT  
ALL-AMERICAN CANAL ANNUAL DISTRIBUTION IN ACRE-FEET

	<u>1986</u>	<u>1985</u>	<u>1984</u>
<u>Station 60 to Drop 1</u>			
<u>Discharge Station 60</u>			
IID	2,700,545	2,717,806	2,682,749
CVWD	342,478	341,303	358,090
Yuma	1,452,892	1,463,306	1,444,361
Pilot Knob (IID Power)	3,676,363	3,844,643	3,783,912
Total	<u>8,172,278</u>	<u>8,367,058</u>	<u>8,269,112</u>
<u>Diversions Station 60 to 1117</u>			
Bard	62,620	62,847	55,034
Siphon Drop and Walapai	331,022	328,058	311,022
<u>Pilot Knob</u>			
YCWUA	1,054,124	1,055,855	1,078,590
IID (Power)	3,337,157	3,659,836	3,598,874
Spillway	<u>324,407</u>	<u>140,065</u>	<u>187,280</u>
Total to River	4,715,688	4,855,756	4,864,744
<u>Loss Station 60 to 1117</u>			
IID	7,756	39,425	(4,365)
CVWD	860	5,240	(456)
Yuma	4,980	16,546	(285)
Pilot Knob (IID Power)	14,945	44,742	(2,242)
Total	<u>28,541</u>	<u>105,953</u>	<u>(7,348)</u>
<u>Discharge Station 1117</u>			
IID	2,692,789	2,678,381	2,687,114
CVWD	341,618	336,063	358,546
Total	<u>3,034,407</u>	<u>3,014,444</u>	<u>3,045,660</u>
<u>Loss Station 1117 to Drop 1</u>			
IID	116,777	61,505	39,829
CVWD	15,461	8,950	6,208
Total	<u>132,238</u>	<u>70,455</u>	<u>46,037</u>

TABLE 4  
IMPERIAL IRRIGATION DISTRICT  
ALL-AMERICAN CANAL ANNUAL DISTRIBUTION IN ACRE-FEET  
(Continued)

	<u>1986</u>	<u>1985</u>	<u>1984</u>
<u>Drop 1 to Westside Main</u>			
Diversions Coachella Turnout	326,157	327,113	352,338
Discharge below Drop 1	2,576,012	2,616,876	2,647,285
Diversions Drop 1 to EHL Check	1,089,283	1,150,980	1,136,484
Loss Drop 1 to EHL Check	37,973	34,482	31,995
Discharge below EHL Check	1,448,756	1,431,414	1,478,806
Diversions EHL Check to CM			
Check	779,227	788,491	808,270
Loss EHL Check to CM Check	23,272	21,431	20,438
Discharge below CM Check	646,257	621,492	650,098
Diversions to CM Check to WSM C	636,113	611,312	641,778
Loss CM Check to WSM Check	10,144	10,180	8,320
<u>Station 60 to Westside Main</u>			
Diversions Station 60 to WSM	7,940,110	8,124,557	8,169,670
Loss Station 60 to WSM	232,168	242,501	99,442

Table 5  
IMPERIAL IRRIGATION DISTRICT  
WATER CONTROL SECTION  
DELIVERED TO USERS IID  
ALL FIGURES IN ACRE FEET

	<u>1984</u>	<u>1985</u>	<u>1986</u>
JANUARY	131,578	95,843	127,290
Year To Date	131,578	95,843	127,290
FEBRUARY	184,803	146,854	126,010
Year To Date	316,381	242,697	253,300
MARCH	258,377	231,738	240,804
Year To Date	574,758	474,435	494,104
APRIL	296,610	303,508	285,464
Year To Date	871,368	777,943	779,568
MAY	263,014	268,271	273,021
Year To Date	1,134,382	1,046,214	1,052,589
JUNE	228,957	235,885	240,100
Year To Date	1,363,339	1,282,099	1,292,689
JULY	220,361	250,972	237,753
Year To Date	1,583,700	1,553,071	1,530,442
AUGUST	226,848	271,651	223,358
Year To Date	1,810,548	1,804,722	1,753,800
SEPTEMBER	200,331	188,734	208,952
Year To Date	2,010,879	1,993,456	1,962,752
OCTOBER	192,006	174,945	152,241
Year To Date	2,202,885	2,168,401	2,114,993
NOVEMBER	123,386	120,137	119,712
Year To Date	2,326,271	2,288,538	2,234,705
DECEMBER	60,057	46,759	101,878
Year To Date	2,386,328	2,335,297	2,336,583
TOTAL TO DATE	2,386,328	2,335,297	2,336,583

Table 6  
Water Deliveries to Cities and Towns

<u>Town or City</u>	<u>1986 Water Delivered Acre-Feet</u>	<u>1986 Population</u>
Calexico	5,082.0	17,973
Holtville	1,786.6	4,829
El Centro	7,131.4	28,058
Imperial	1,804.2	4,004
Brawley	7,563.8	18,058
Westmorland	702.0	1,849
Calipatria	1,213.2	2,747
Niland	1,183.2	1,042
Seeley	338.5	1,058
Heber	<u>253.4</u>	<u>2,221</u>
Totals	27,058.3	81,839

Population figures from Imperial County Division fo Community Economic Development "Facts and Figures for 1986-87".

On December 30, 1985, the elevation of the Salton Sea was -226.85 feet, compared to -226.80 feet on December 31, 1986.

The water surface area of the Sea at the end of 1986 was 243,600 acres, 150 acres greater than one year earlier (based on Area/Capacity Table, Exhibit II.7 of the 1985 Water Conservation Plan). Refer to Table 7.

Inflow to the Salton Sea from Imperial Valley and Mexico, including natural runoff flowing in New and Alamo Rivers was 1,092,946 AF in 1985 and 1,100,694 in 1986. These figures and the components of inflow to the Salton Sea are given in Table 8.

#### Salt Balance

The District prepares periodic reports on inflow and outflow of salt, based upon water quality measurements, to determine if greater quantities of salt are being removed from the soils than are added. The data presented in Table 9 shows that in 1986, salt inflow from the Colorado River via the All-American Canal totaled about 1.82 million tons, while 2.84 million tons were removed from the soil by the drainage waters discharged into the Salton Sea.

TABLE 7

SALTON SEA EVAPORATIONScreened Evaporation Pans

(Averages for 3 Weather Stations)

Reported Actual Evaporation in Feet<sup>1/</sup>

	<u>25-Yr. Avg.</u>	<u>1985</u>	<u>1986</u>	<u>1986 Difference</u>	
	<u>1958-1984</u>			<u>From Avg.</u>	<u>From 1985</u>
January	0.29	0.24	0.20	- 0.09	- 0.04
February	0.36	0.27	0.26	- 0.10	- 0.01
March	0.57	0.45	0.42	- 0.15	- 0.03
April	0.78	0.65	0.68	- 0.10	0.03
May	0.98	0.82	0.81	- 0.17	- 0.01
June	1.06	0.89	0.88	- 0.18	- 0.01
July	1.08	0.91	0.95	- 0.13	0.04
August	1.04	0.91	0.85	- 0.19	- 0.06
September	0.87	0.72	0.83	- 0.04	0.11
October	0.66	0.52	0.49	- 0.17	- 0.03
November	0.42	0.28	0.35	- 0.07	0.07
December	0.31	0.17	0.22	- 0.09	0.05
TOTAL	8.42	6.83	6.94	- 1.48	0.11

<sup>1/</sup> Observed pan evaporation plus rainfall

Table 8  
INFLOW TO SALTON SEA

	<u>1986</u>	<u>1985</u>	
Alamo Channel:	1,920	1,867	A.F.
*Crossing Line from Mexico	1,695	1,525	A.F.
Main Canal Operational Loss	( 6,179)	( 5,804)	A.F.
501,556ion Operational Loss	501,556	511,959	A.F.
Drainage	498,992	509,547	A.F.
Metered at Outlet			
<hr/>			
New River Channel:		260,238	A.F.
*Crossing Line from Mexico	264,837	410	A.F.
Main Canal Operational Loss	213		
Division Operational Loss		228,884	A.F.
Drainage	247,298	489,532	A.F.
Metered at Outlet	512,348		
<hr/>			
Direct to Sea..		4,573	A.F.
Main Canal Operational Loss	3,851	4,624	A.F.
Division Operational Loss	3,655	84,670	A.F.
Drainage	81,848	93,867	A.F.
Total	89,354		
<hr/>			
Summary:		262,105	A.F.
*Crossing Line from Mexico	266,757	6,508	A.F.
Main Canal Operational Loss	5,759	( 1,180)	A.F.
Division Operational Loss	( 2,524)	825,513	A.F.
Drainage	830,702	1,092,946	A.F.
Total to Sea	1,100,694		

ELEVATION OF THE SALTON SEA:

<u>December 31, 1986</u>	<u>December 31, 1985</u>
-226.80	-226.85

( ) Gain

\*Computed from Meter Stations at the Boundary.

TABLE 9

SUMMARY OF SALT BALANCE  
EXCLUDING WATER AND SALT FROM MEXICO

Year	INFLUENT 1/			EFFLUENT			Tons Salt Diff.	Percent Loss or Gain
	Total Discharge AF	Tons of Salt Brought Into the Area	Weighted Average 2/ I.A.F. P.P.M.	Total Discharge AF	Tons of Salt Removed	Weighted Average 2/ I.A.F. P.P.M.		
1958	2 730 876	2 723 153	1.00 735	974 045	3 341 376	3.43 2 521	618 223	22.70
1959	2 840 173	2 852 019	1.00 735	1 020 963	3 401 652	3.33 2 448	549 633	19.27 gain
1960	2 983 860	3 162 485	1.06 779	1 059 804	3 558 534	3.36 2 470	396 049	12.52 gain
1961	2 957 200	3 330 087	1.13 831	1 050 700	3 572 808	3.40 2 499	242 721	7.29 gain
1962	2 951 266	3 399 464	1.15 845	1 088 965	3 806 946	3.50 2 573	407 482	11.99 gain
1963	2 991 429	3 378 583	1.13 831	1 153 827	4 050 087	3.51 2 580	671 504	19.88 gain
1964	2 770 474	3 284 284	1.19 875	905 153	3 635 121	4.02 2 955	350 837	10.68 gain
1965	2 624 363	3 406 457	1.30 955	882 962	3 819 255	4.33 3 183	412 798	12.12 gain
1966	2 817 912	3 650 447	1.30 955	1 004 685	4 148 874	4.13 3 036	498 427	13.65 gain
1967	2 719 861	3 306 261	1.22 897	1 027 970	4 139 477	4.03 2 962	833 216	25.20 gain
1968	2 806 124	3 408 548	1.21 889	1 001 027	4 012 009	4.01 2 947	603 461	17.70 gain
1969	2 675 833	3 396 105	1.27 933	962 639	3 754 477	3.90 2 867	358 372	10.55 gain
1970	2 754 898	3 488 023	1.27 933	1 020 503	3 780 732	3.70 2 719	292 709	8.39 gain
1971	2 883 969	3 666 277	1.27 933	1 092 571	3 900 990	3.57 2 624	234 713	6.40 gain
1972	2 846 613	3 541 248	1.24 911	1 063 537	3 886 592	3.65 2 683	345 344	9.75 gain
1973*	2 956 013	3 492 199	1.18 867	1 065 414	3 980 338	3.74 2 749	488 139	13.98 gain
1974*	3 072 327	3 669 832	1.19 875	1 123 492	4 204 158	3.74 2 749	534 326	14.56 gain
1975*	3 001 207	3 581 043	1.19 875	1 128 268	4 196 407	3.72 2 734	615 364	17.18 gain
1976*	2 783 630	3 263 454	1.17 860	1 084 993	4 361 658	4.02 2 955	1 098 204	33.68 gain
1977*	2 693 030	3 039 155	1.13 831	1 020 797	4 187 227	4.10 3 014	1 148 072	37.78 gain
1978*	2 671 798	2 897 906	1.08 797	995 674	3 824 323	3.84 2 823	926 417	31.97 gain
1979*	2 803 166	3 216 228	1.15 843	1 056 652	3 998 131	3.78 2 781	781 903	24.31 gain
1980*	2 769 495	3 058 785	1.10 812	1 043 241	3 988 611	3.82 2 810	929 826	30.40 gain
1981*	2 769 112	3 192 402	1.15 847	962 925	3 825 050	3.97 2 920	632 648	19.82 gain
1982*	2 515 637	2 918 781	1.16 853	888 575	3 608 490	4.06 2 985	689 709	23.63 gain
1983*	2 416 885	2 538 349	1.05 772	867 835	3 333 260	3.84 2 822	794 911	31.32 gain
1984*	2 647 285	2 654 712	1.00 737	895 034	3 360 256	3.75 2 759	705 544	26.58 gain
1985*	2 616 876	2 468 408	0.94 691	830 841	3 296 232	3.97 2 918	827 824	33.54 gain
1986*	2 576 012	1 821 898	0.71 522	833 937	2 837 518	3.40 2 499	1 015 620	55.75 gain

Note: Part of the water in Alamo River from Mexico was used for irrigation in U.S. prior to January 4, 1958.

1/ Based on weekly samples at All-American Canal Station 2963 (East Highline Check) 1958 through 1972

2/ P.P.M. =  $735 \times \text{I.A.F.}$

Prior to January, 1, 1970, all salt concentrations were obtained by evaporation and drying at 105° C.

Subsequent to January, 1970, concentrations were obtained by drying at 180°C.

\*Based on weekly samples at All-American Canal below Drop 1

## SECTION 2

### 2. ADMINISTRATIVE ACTIVITIES

#### 2.1 BOARD OF DIRECTORS

This section describes actions taken by the District Board of Directors, regarding water conservation and related matters such as the proposed water transfer.

Actions by the Board of Directors extracted from the official minutes listed in Exhibit 1, consist of 13 pages.

EXHIBIT 1

IMPERIAL IRRIGATION DISTRICT

Actions and Discussions by District Board of Directors  
Regarding Water Conservation Programs and Water Exchange Proposals  
January 1986 through December 1986  
Source. Secretary's Notes

Date	Action
<u>January 21, 1986</u> - The Board scheduled a Special Meeting for 7:00 p.m., Thursday, January 30, 1986, to meet with the County Board of Supervisors and discuss the District's Water Conservation Plan, 1986, and the Water Conservation Planning and Development Agreement between the District and Parsons Water Resources, Inc.	
	Moved by Director Benson, seconded by Director Moore, that we authorize the distribution of a "Notice of Preparation" for the preparation of a Program Environmental Impact Report on the Implementation of a Water Conservation Program by the Imperial Irrigation District and the Board of Supervisors and discuss the District's Water Conservation Plan, 1986, and the Water Conservation Planning and Development Agreement between the District and Parsons Water Resources, Inc. Motion Carried.
	Moved by Director Benson, seconded by Director Moore, that we authorize the distribution of a "Notice of Preparation" for the preparation of a Program Environmental Impact Report on the Implementation of a Water Conservation Program by the Imperial Irrigation District and the Potential Initial Transfer of 100,000 AF/Year of Previously Conserved Water; schedule a Public Meeting for 7:00 p.m., Wednesday, February 5, 1986, to receive public comments and concerns which should be addressed in the Environmental Report, and authorize publication of a Notice of Public Meeting in all the local newspapers. Motion Carried.
	Ron Hull, Director, Public Information and Community Services, presented a brief video showing maintenance work on the East Highline Canal during the recent cutout, and a pumpback system in operation.
	Moved by Director Moore, seconded by Director Benson, that all references to the ownership, operation or maintenance of Imperial Irrigation District water conservation facilities or improvements by Parsons Water Resources, Inc., be eliminated from the contract between the District and Parsons; and the Chief Legal Counsel be directed to notify Parsons of this action. Motion Carried.

January 30, 1986 - General Manager C. L. Shreves, reviewed the procedures followed in the selection of Parsons Water Resources, Inc., as engineering consultants to the District. He then discussed the provisions and requirements of the Water Conservation Planning and Development Agreement between the District and Parsons Water Resources.

Mel Brown, Local Project Manager for Parsons Water Resources, described the studies and services performed by Parsons Water Resources up to the present date. He also described the Program and Focused Environmental Impact Reports to be prepared covering potential transfer of conserved water.

James Harmon, an attorney speaking for the Imperial Valley Water Committee, outlined four concerns the Committee had.

1. The legal issue of whether the District had the authority to transfer conserved water should be resolved before the District incurs substantial costs to implement conservation programs to create water for the purpose of transfer.
2. The District should avoid too much delegation to outside interests.
3. The Committee feels very strongly that the District should terminate its contractual relationship that exists with Parsons Water Resources.
4. The Committee does favor the preparation of a programmatic type of Environmental Impact Report addressing the District's long-range plans, but believes other issues should be resolved first, principally legal issues.

February 10, 1986 - President Edwards called the meeting to order and stated that this special meeting had been called to discuss the letter dated February 5, 1986, from the County Board of Supervisors requesting that Imperial Irrigation District voluntarily agree to set aside the Water Conservation Plan adopted in August 1985, until the Environmental Impact Report process is completed.

Director Moore read the following letter and moved that the President be authorized to execute the original for transmittal to the County. Motion Carried.

February 10, 1986

Mr. Abe F. Seabolt, Chairman  
Imperial County Board of Supervisors  
940 West Main Street  
El Centro, CA 92243

Dear Mr. Seabolt:

This is in response to your letter of February 5, 1986, concerning the Board

of Supervisors' request that IID voluntarily agree to set aside its Water Conservation Plan adopted in August 1985, until the EIR process is completed.

For a number of reasons, it would be inappropriate, and would serve no useful purpose, for the IID to set aside its Plan. It is the District's belief that litigation concerning this matter is unnecessary and would result in a waste of County and District public funds.

As we have said repeatedly, the EIR being prepared by the District will address, among other things, all of the environmental aspects of the Plan. The District believes that all of the County's concerns will be resolved in the EIR.

If the County elects to file suit against the District, we will be forced, unfortunately, to vigorously defend the suit.

Yours truly,

LEROY E. EDWARDS  
President  
Board of Directors

February 18, 1986 - Doug Welch, Supervisor, Water Conservation, reviewed a proposal for development of a workable incentive program that might persuade farmers to conserve water. He recommended that a Committee, composed of farmers from different areas of the Valley who farm various types of crops, be appointed by the Water Conservation Advisory Board. This committee, together with staff personnel of the District and Parsons Water Resources, would then identify and evaluate various incentives to choose the most logical that could receive broad farmer support. Mr. Welch then presented a list of potential incentives and a criteria for evaluating these or alternative incentives. He displayed a tentative timetable for developing and implementing an incentive program for water conservation.

March 4, 1986 - Mr. Horace McCracken presented a proposal to the Board for construction of a dike around a portion of Salton Sea as a method of reducing the salinity and the level of the Sea.

Moved by Director Moore, seconded by Director Benson, that we retain the law firm of Latham & Watkins to assist District Legal Counsel in defending the County of Imperial vs. Imperial Irrigation District. Motion Carried.

March 25, 1986 Moved by Director Allen, seconded by Director Condit, that the General Manager be authorized to execute a Contract with the State Department of Water Resources which provides a grant to the District to develop a computerized scheduling program in cooperation with the California Irrigation Management Information System (CIMIS). Said grant provides \$25,000.00 for each of the following fiscal years, 1985/86, 1986/87, and 1987/88 (subject to funding availability) and shall not exceed \$75,000. Motion Carried.

The Directors, General Manager and Chief Legal Counsel discussed the present status of the negotiations with Metropolitan Water District concerning a possible water sale or transfer, the possibility of specifying that a certain percentage of any revenue received from a water sale or transfer be used exclusively for onfarm conservation practices, and beginning negotiations with another agency, such as San Diego County Water Authority for a possible water sale or transfer.

The Draft Environmental Impact Report (EIR) covering an expanded water conservation program by Imperial Irrigation District and the initial transfer of 100,000 acre feet per year of conserved water, as prepared by District staff with the assistance of Parsons Water Resources, Inc.

Moved by Director Condit, seconded by Director Moore, that the Real Estate and Right of Way Section be authorized to open an escrow for the purchase of 11.35 acres of land located in Section 4, T. 13 S., R. 12 E., S.B.B.M., presently owned by Cipriano DeLira. Said land is required for construction of the Trifolium Extension Reservoir and is to be purchased for \$17,025.00 or \$1,500.00 per acre. Motion Carried.

April 22, 1986 - Director Allen read a prepared statement which concluded with the following motion:

1. That it is in the best interest of the District to retain the services of Parsons on an as needed basis but only under a modified agreement.
2. That the General Manager and Chief Legal Counsel review the Agreement and propose suitable amendments for discussion with Parsons, and if an agreement cannot be reached with Parsons by May 13, 1986, then Parsons be given notice of termination as provided in the current Agreement.
3. That the amendments make clear that:
  - a. Any services provided by Parsons will only be provided after Board approval.
  - b. Service fees to Parsons will not be tied to the transfer of water or to the cost of construction, but shall be paid under a more conventional arrangement, such as cost plus fixed fee.
  - c. Parsons will be precluded from doing any construction.
  - d. All services will be performed by Parsons only at the direction of the District, that Parsons will only make recommendations and that all decisions will be made by the District which will have full control and all approval rights.

April 29, 1986 - Moved by Director Condit, seconded by Director Benson, that the standby charges for a portable electric pumpback system to be installed by farmer Michael Morgan of Brawley shall be paid from Water Conservation funds for a period of five ((5))years. Motion Carried.

Mr. Horace McCracken presented and described a method of reducing the salinity and level of the Salton Sea by constructing a dike around a thirty (30) square mile area within the Sea; and also described various methods of financing such a project.

The Board thanked Mr. McCracken for his presentation,. but deferred action on this matter for the present.

Moved by Director Condit, seconded by Director Moore, that Resolution No. 14-86, as amended, be adopted.

Re: Expressing the District's support for Proposition 44, which will appear on the June 3, 1986, primary election ballot.

The Vice President announced that the Board had agreed in the closed session to approve a Draft of an Amended Water Conservation Planning and Development Agreement between the District and Parsons Water Resources, Inc., to make copies of the Draft Agreement available for public review, have the text of the Draft Agreement published in the newspaper; and schedule a Public Meeting for 7.30 p.m., Tuesday, May 13, 1986, to receive public comment on the Draft Agreement.

May 13, 1986 - President Edwards called the Meeting to order and stated that this Special Meeting has been called to conduct a Public Hearing to receive comment on an amended "Water conservation Planning and Development Agreement" between the District and Parsons Water Resources, Inc.: and to take any appropriate action relating to the amended Agreement.

Chief Legal Counsel John P. Carter reviewed modifications which has been proposed for the April 29, 1986, Draft of an Amended Agreement between the District and Parsons.

He stated that he has talked with representatives from Parsons and believes it is their position that this proposed Draft Amended Agreement, if approved by the Board, would be accepted by Parsons; however, only in the instance the Board does not approve a participation type of payment under the payment provisions.

He then read a letter, dated May 9, 1986, from Parsons requesting that an incentive provision in the Agreement be placed on the Agenda for the Board's consideration, worded as follows: "For its negotiation and related services Parsons shall be paid two percent (2%) of the total revenues received under the terms of any contract consummated by the District for the transfer of water resulting from the services performed by Parsons during the term of this Agreement."

The President declared the Meeting open for Public Comment.

The following people spoke to the Board regarding this matter.

Jack Strobel	Mrs. John Menvielle
Rick Mealey	Cliff Hurley
Jack McConnell	Marjorie Severns

There being no further comment from the audience, the President asked for comments from the Board.

After some discussion it was moved by Director Condit, seconded by Director Allen, that we rescind the Motion passed at the Special Meeting of April 22, 1986, pertaining to amendment of the Agreement between the District and Parsons Water Resources, Inc. and adopt the following Motion:

- (1) That it is in the best interests of the District to retain the services of Parsons on an as needed basis but only under a modified Agreement.
- (2) That the General Manager and Chief Legal Counsel review the Agreement and propose suitable amendments for discussion with Parsons, and if an agreement cannot be reached with Parsons by May 27, 1986, then Parsons be given notice of termination as provided in the current Agreement.
- (3) That the amendments make clear that:
  - a. Any services provided by Parsons will only be provided after Board approval.
  - b. Service fees to Parsons will not be tied to the transfer of water or to the cost of construction, but shall be paid under a more conventional arrangement, such as cost plus fixed fee.
  - c. Parsons will be precluded from doing an construction.
  - d. All services will be performed by Parsons only at the direction of the District; that Parsons will only make recommendations and that all decisions will be made by the District which will have full control and all approval rights.

Roll Call: Directors Condit, Allen, Benson and Edwards voting yes.  
Director Moore absent.

Motion Carried.

Moved by Director Allen, seconded by Director Edwards, that we deny the request of Parsons Water Resources, Inc. to receive two percent (2%) of the revenue received by Imperial Irrigation District for the transfer of any water, which was submitted by letter dated May 9, 1986.

Roll Call: Directors Condit, Allen and Edwards voting yes. Director Benson voting no. Director Moore absent.

Motion Carried.

May 27, 1986 - Moved by Director Allen, seconded by Director Moore, that we approve the "Amended Water Conservation Planning and Development Agreement" between the District and Parsons Water Resources, Inc.; and authorize the President and Secretary to execute the Agreement on Behalf of the District.

Roll Call: Directors Condit, Moore, Allen and Edwards voting yes. Director Benson voting No.

Motion Carried.

June 10, 1986 - Moved by Director Moore, seconded by Director Benson, that we authorize the preparation of a Negative Declaration covering the construction of the Trifolium Extension Reservoir; authorize circulation of the Negative Declaration for public review; and schedule a Public Hearing for 9:00 a.m.,

Tuesday, August 5, 1986, to receive public comments prior to consideration of approval of the Negative Declaration.

Motion Carried.

June 24, 1986 - Steve Magnussen, Mike Stuver, Jack Johnson, Carl Mayrose and Jeff Addiego from the U.S. Bureau of Reclamation appeared before the Board to review and discuss the status of the Lower Colorado River Water Supply and All American Canal Lining Studies presently being conducted by the Bureau and also calculation of the return flow credit for the area between Imperial Dam and Pilot Knob.

During discussion of the All American Canal Lining Study, slides were displayed of equipment proposed for concrete lining the Canal in place without interrupting the flow of water or operation of the Canal. As this concept and equipment is untested they requested the District's participation in lining a one mile section of the All American Canal to test this method of concrete lining.

After discussion of the Water Supply Study and the return flow calculation, the Board asked the Bureau representatives to present, in writing, their request for the District's participation in an experimental concrete lining of one mile of the All American Canal and their request for the District's concurrence in allocation of 28,000 acre feet of conserved water for makeup of the reject stream of the Yuma Desalting Plant.

Mel Brown, Project Director, Parsons Water Resources, Inc., reviewed the status of the work presently being performed by Parsons together with the amounts

budgeted and the estimated expenditures for this work through June 30, 1986; and requested that Parsons be allowed to continue with the work previously authorized for the balance of 1986 in accordance with the not-to-exceed funding limitations.

After discussing the work to be performed by Parsons Water Resources, Inc. during the balance of 1986, it was moved by Director Edwards, seconded by Director Moore, that Parsons complete work on the Program and Focused Environmental Impact Report; complete the On-Farm Incentives portion of the Water Conservation Implementation Plan; and terminate, with reasonable notice, all other work previously authorized, including negotiation assistance.

After further discussion, the previous Motion was withdrawn and it was moved by Director Benson, Seconded by Director Condit, that the following actions be taken regarding the work to be performed by Parsons during the balance of 1986:

1. General Manager to issue a stop work order on the Water Conservation Implementation Plan, effective August 31, 1986.
2. General Manager direct Parsons to provide no further assistance on negotiations unless requested.
3. General Manager direct Parsons to continue work on all other tasks previously authorized for the balance of 1986, in accordance with the not-to-exceed funding limitations.

Roll Call: Directors Condit, Moore, Allen, Benson and Edwards voting yes.  
Motion Carried.

Director Benson, Commenting on the over all Water Transfer situation, proposed that the Board take the following actions:

1. Adopt a Resolution stating that any proposed Water Transfer Agreement must be approved by a vote of the people of Imperial Valley.
2. Establish an ad hoc citizens committee entitled "The Water Transfer Advisory Committee" who would meet and determine how the revenue from a potential Water Transfer Agreement should be spent. This committee to be composed of two persons appointed by each Director.

After discussing Director Benson's suggestions, the Board scheduled a Special Board Meeting for 10:00 a.m., Tuesday, July 8, 1986, to discuss these matters further.

Moved by Director Moore, seconded by Director Benson, that the General Manager be authorized to execute a letter directed to the Resources Agency of California stating that the District will participate in an interagency task force to analyze potential funding sources of an engineering project designed to stabilize both the water and salinity levels of the Salton Sea; and designating Randall Stocker, Ph.D., as the District's representative on the task force.

Motion Carried.

July 15, 1986 - Moved by Director Benson, seconded by Director Moore, that the President be authorized to execute a letter, including the additions and revisions discussed today, directed to the President of Metropolitan Water District. This letter requests that Metropolitan Water District express its position on four of the most important issues remaining in reaching agreement for a Water Transfer between Metropolitan and Imperial Irrigation District.

Motion Carried.

Moved by Director Benson, seconded by Director Edwards, that we adopt a Resolution which removes the specific requirements of Resolutions No. 49-76 and 26-81 to set aside \$1.75 per acre-foot of the Agricultural Water Rate for water conservation program.

Roll Call: Directors Condit, Moore, Allen, Benson and Edwards voting no.

Motion Did Not Carry.

The Board reviewed a slide presentation highlighting the potential positive aspects of a water transfer agreement which had been prepared by the Public Information Office for use at service club and group meetings.

Bob Wilson, Water Department Manager, presented and reviewed cost estimates for pumping various flows of water from the proposed Trifolium Reservoir for one day and on an annual basis.

The Board tabled until the August 19, 1986, Board Meeting, a response to a letter from the U.S. Bureau of Reclamation containing their request for the District to:

1. Consent to Federal use of up to 28,000 acre-feet of water annually to replace the reject stream from the Federal desalting plant at Yuma, and
2. Will the District accept in-place concrete lining of the All-American Canal as the preferred plan and participate in a prototype project.

Moved by Director Benson, seconded by Director Moore, that the General Manager be authorized to notify the U.S. Bureau of Reclamation that the District con-

curs in amending the Scope of Work, Section 3, of Cost-Sharing Agreement No. 5-AG-30-03490 covering the Bureau's participation in the I.I.D. Canal Study and System Improvement Study for the balance of fiscal year 1986-87.

Motion Carried.

Moved by Director Benson, seconded by Director Moore, that the President be authorized to execute a letter directed to the State Office of Water Conservation providing additional information regarding the District's application for a loan under the Clean Water Bond Law of 1984.

Motion Carried.

The General Manager presented the Negative Declaration of the proposed Trifolium Extension Reservoir and stated that the Board of Directors had authorized preparation of the Negative Declaration at the June 10, 1986 and circulation for public review according to Imperial Irrigation District's meeting, Local Guidelines for Implementation of the California Environmental Quality Act. He further stated that a public hearing was set for August 5, 1986 and later changed to August 19, 1986, to consider comments received before discussion of the Major Work Authorization No. 86-W-1. The Negative Declaration was sent to the State Clearing House and a letter acknowledging receipt had been received and that no comments had been filed with them.

He further stated that a letter had been received from the Department of Fish and Game asking several questions, which were answered, and no further questions or inquiries have been received.

The President then declared the meeting open for a public hearing on the Negative Declaration. No one spoke or presented comments and the public hearing was then closed by the President.

Moved by Director Benson, seconded by Director Condit, approving the Negative Declaration, and authorizing the General Manager to file a Notice of Determination with the State Office of Planning and Research and the Imperial County Clerk.

Motion Carried.

Since the Board approved the Negative Declaration and filing of Determination, the General Manager presented Major Work Authorization No. 86-W-1 for the construction of the Trifolium Extension Reservoir, located in portions of Tract 140, Lots 4, 5 and 7, Section 4, T. 13 S., R. 12 E., S.B.B.&M., for an estimated cost of \$1,600,000. Financing of the project will be obtained from the California Department of Water Resources under the Low Interest Water Conservation Loan Program which is part of the Clean Water Bond Act of 1984.

Repayment of the loan will be from the Water Conservation Account, per Board Resolution 28-81 and will be on a 20 year loan payback schedule.

Moved by Director Condit, seconded by Director Benson, to approve Major Work Authorization No. 86-W-1.

Further discussion ensued and Mr. Jesse Silva, Chief Civil Engineer, presented charts showing the location, and explained the operation and maintenance of the reservoir and surrounding canals and drains.

Director Moore stated that we do not have sufficient funds at this time for construction but could possibly purchase the property. The General Manager stated that the project is only in the planning and development stage at this time until funds are received.

Director Benson made a motion that the reservoir be developed to include public recreational facilities including fishing, picnic facilities and a sand area at the west end of the reservoir. No second to the motion was made.

The President then called for the original motion to approve Major Work  
~~Authorization No. 86-W-1.~~

Roll Call: Directors Condit, Allen, Benson and Edwards voting yes,  
Director Moore voting no.

Motion carried.

The Board accepted without action a progress report from the Water Conservation Task Group, presented by the General Manager, on the Water Conservation Plan. The Chief Legal Counsel stated that although action does not need to be taken, the information and reports are considered as public documents and available for Public review.

The General Manager made a presentation to the Board on the Preliminary Final EIR for the proposed water conservation program and initial water transfer. He stated that it will be considered for adoption at the September 9, 1986 Board meeting.

The President requested clarification from the Chief Legal Counsel as to whether the document was now a public document, and the Chief Legal Counsel explained that when the document is finalized and ready with all comments to be presented to the Board, the Final EIR can be made available to the public.

The President directed the General Manager to make the document available to the public, when it is ready for recommendation to the Board, before the next meeting.

The General Manager read into the record a letter received on August 8, 1986 of Reclamation, from Roy D. Gear, acting for Edward M. Hallenbeck, Bureau Boulder City, regarding their position on lining of the All-American Canal, the use by the United States of up to 28,000 acre-feet of water per year to replace the reject stream, and the transfer of ownership of the All-American Canal, and his letter on the District's position.

The President instructed the General Manager to arrange a meeting to include the Bureau, their representatives in Washington and a committee from the IID Board to discuss the issues and also the possibility of entering into an agreement with the Bureau for the purchase of conserved water.

After a discussion regarding statements made by Metropolitan Water District in Editorials appearing in the Los Angeles Times on August 12, 1986, and the San Diego Union on August 10, 1986, on water sales negotiations between IID and MWD, a motion was made by Director Condit, seconded by Director Benson that the Chief Legal Counsel prepare a letter and send to MWD with copies to the Los Angeles Times, San Diego Union, and the Imperial Valley Press, reiterating the offer made to them and as long as they cannot come to an agreement with our terms, negotiations will be terminated for the present.

Roll Call: Directors Condit, Moore, Benson, Edwards voting yes,  
Director Allen voting no.

Motion carried.

The Board also discussed the possibility of approaching the San Diego Water Authority to discuss the sale of conserved water to it.

The President directed that the letter to MWD be approved by the motion maker and the second before distribution; and also, that the General Manager arrange a meeting with editors of the newspapers sometime after Labor Day to make sure they clearly understand our position.

Moved by Director Benson, seconded by Director Allen, to accept the action of the Water Conservation Advisory Board declaring one position in Division 1 and one position in Division 5 as vacant according to Section 2.06 of the Bylaws, due to excessive absences of the incumbents, and Directors Condit and Edwards, from Divisions 1 and 5 respectively are to appoint a replacement to fill the vacancies on the Water Conservation Advisory Board.

Motion carried.

The General Manager presented a letter received from Lawrence J. Fay, Corporate Vice President, IT Corporation requesting that a 40 acre parcel of land located within the IID service area at Section 16, T. 13 S., R. 12 E., known as Parcel No. 034-030-28-01, be excluded from the IID service area, and a 40 acre parcel contiguous to Section 16 located at the Southwest 1/4 of Section 10, T. 13 S., R. 12 E., known as Parcel No. 034-070-07-01 be included which is presently outside the IID service area. He explained that there is a need for water at the IT hazardous waste disposal facility to comply with conditions contained in the Land Use Permit.

Mr. Fay addressed the Board and stated that the Corporation needs about 15 acre-feet of water per year for use in Section 16 which is outside the IID service area and proposed substituting 40 acres within the service area for 40 acres in Section 16 which is outside the service area. They are contiguous parcels of land and IT owns both parcels.

Moved by Director Benson, seconded by Director Allen, authorizing the General Manager to proceed with discussions with all agencies concerned regarding the exchange of land as proposed.

Motion carried.

It was also moved by Director Benson and seconded by Director Allen that if a solution could not be agreed upon by all parties, that the District consider selling conserved water to the IT Corporation at \$250 an acre-foot.

Motion carried.

## 2.2 WATER CONSERVATION ADVISORY BOARD

The Water Conservation Advisory Board met regularly during 1986, the minutes of these meetings and resolutions are contained in Exhibit 2. Some of the activities by the Advisory Board included the following:

1. Review and discussion of tailwater recovery program, 1st Year Report, including field tour at Veysey Ranch.
2. Development of Incentive Program Report.

During the first several weeks of 1986, the Incentive Committee appointed by the chairman met several times to develop, evaluate and recommend a program.

Passed Resolution No. 86-1 recommending that the District Board of Directors consider implementation of seven water conservation measures which include:

1. Irrigation training.
2. Reduced irrigation water rate/tailwater payments.
3. Pumpback standby charges.
4. Twelve hour runs for stand establishment.
5. Various changes in the 21-Point water conservation program.
6. Zanjero training on water deliveries and measuring procedures.
7. Unauthorized gate adjustments.

SECRETARY'S MINUTES  
WATER CONSERVATION ADVISORY BOARD  
January 9, 1986

The Water Conservation Advisory Board held an informal meeting at 1:30 p.m., Thursday, January 9, 1986 at the Imperial Irrigation District's Tailwater Recovery Demonstration site located at Newside, Lateral 3, gate 33.

Mr. John Veysey discussed the operation of the tailwater recovery system and Mr. Doug Welch explained the installation and operating costs. Two irrigations had been monitored since the system was installed. Mr. Doug Welch reported that tailwater was three percent on the first irrigation and no tailwater was discharged into the District drainage system on the second irrigation.

The meeting was adjourned. The next meeting will be held on Thursday, February 13, 1986 in the Board of Directors room, at 1:30 p.m..

SECRETARY'S MINUTES  
WATER CONSERVATION ADVISORY BOARD  
May 15, 1986

The Water Conservation Advisory Board convened in a regular session at 1:30 P.M., Thursday, May 15, 1986.

The roll was called and the minutes were approved as read.

Mr. Doug Welch presented some data on the IID's Demonstration Tailwater Recovery Systems. He gave a summary of John C. Veysey's system on the Newside Lateral, announcing this system was averaging 0.1% tailwater.

Mr. Steve Knell was introduced as the District's new Water Conservation Agricultural Engineer.

Mr. Twogood announced that the IID had a possibility of receiving a loan for \$2 - 3 million, at 5% interest, from the Department of Water Resources.

Chairman Brad Luckey said that the Incentives Subcommittee has had four meetings so far. Thirty incentives have been identified, and they will be evaluated in the next few weeks.

The meeting was adjourned. The next meeting will be held July 10, 1986 at 2:00 p.m., in the Board of Directors Room.

SECRETARY'S MINUTES  
WATER CONSERVATION ADVISORY BOARD  
February 13, 1986

The Water Conservation Advisory Board convened in a regular session at 1:30 P.M., Thursday, February 13, 1986.

The roll was called and the minutes were approved as read.

Doug Welch reported, that at the District's request, Dick Palmer of the Parsons Corporation had put together a program for developing an "Incentive Program for Water Conservation." Mr. Welch then briefly described the proposed program which included;

The WCAB should appoint a committee to develop a workable incentive program that farmers will use to conserve water;

Identify all incentive alternatives;

Develop evaluation criteria;

Evaluate all approaches;

Select and recommend to the WCAB viable incentives;

WCAB recommend implementation to District Board;

Implement program;

Evaluate results.

The chairman asked for comments on the proposed program. The majority of the members present did not feel that they wanted to pursue such a program at this time. The chairman said that since there were only seven members present he was going to contact the other members of the committee to discuss the program with them and that the program would be reviewed again at the next meeting.

The meeting was adjourned. The next meeting will be held THURSDAY, March 6, 1986 at 1:30 P.M., in the Board of Directors Room.

SECRETARY'S MINUTES  
WATER CONSERVATION ADVISORY BOARD  
MARCH 6, 1986

The Water Conservation Advisory Board convened in a regular session at 1:30 P.M., Thursday, March 6, 1986.

The roll was called and the minutes were approved as read.

Mr. Dick Palmer of the Parsons Corporation gave a presentation on an incentive program for water conservation. He suggested:

The WCAB should appoint a committee to develop a workable incentive program that farmers will use to conserve water;

Identify all incentive alternatives;

Develop evaluation criteria;

Evaluate all approaches;

Select and recommend to the WCAB viable incentives;

WCAB recommend implementation to District Board;

Implement program;

Evaluate results.

The chairman appointed six people to a committee for ideas only, they are: Dick Lyerly, Mark Osterkamp, Bob Richter, Brad Lucky, Larry Gilbert, and Tom Heffernan.

The meeting was adjourned. The next meeting will be held THURSDAY, May 15, 1986 at 1:30 P.M., in the Board of Directors Room.

SECRETARY'S MINUTES  
WATER CONSERVATION ADVISORY BOARD  
August 7, 1986

The Water Conservation Advisory Board convened in a regular session at 1:30 P.M., Thursday, August 7, 1986.

The roll was called and the minutes were approved as read.

Mr. Steve Knell briefly outlined three new projects that he has been working on since starting work at the District. The District has arranged for the reporting of CIMIS Evapotranspiration Data each day in the newspaper. The curriculum for an irrigation training program has been started and the first draft of an Irrigation and Salinity Manual has been completed.

Resolution 86-1 which was prepared by the Incentives Committee was reviewed. After a lengthy discussion several changes were made in the resolution. Earl Sperber moved to accept the resolution as changed. The motion was seconded by John Veysey. A unanimous vote was cast in favor of the resolution.

Mr. Larry Gilbert reported that the nomination committee had not met and had no recommendations at this time.

The poor attendance records of several members of the WCAB were reviewed. After discussion, all six members of the WCAB present at the meeting declared the positions now held by Edward Menvielle and George Stergios vacant as provided for in the Bylaws of the WCAB. Both members had missed more than ten meetings. Directors, Condit and Edwards, will be notified of the action taken.

The meeting was adjourned. The next meeting will be held December 17, 1986 at 1:30 p.m. in the Board of Directors Room.

Secretary's Minutes  
Water Conservation Advisory Board  
December 17, 1986

The Water Conservation Advisory Board convened in a regular session at 1:30 p.m., Wednesday, December 17, 1986.

The roll was called and the minutes were approved as read.

A copy of the Incentive Committee Report to the Water Conservation Advisory Board was handed out. Brad Luckey asked that the members review the report and be prepared to discuss it at the next meeting.

Mr. Clyde Shields and Mr. Steve Burch of Crop Irrigation Technologies gave a presentation on the irrigation scheduling service that they are now providing.

Mr. Robert Wilson and Mr. John Van Bebber gave a report on the 45 day trial of 12 hour runs in the Holtville Division.

Mr. Doug Welch gave a presentation of the past years operation of the District's Demonstration Tailwater Recovery Systems.

The meeting was adjourned. The next meeting will be held February 12, 1987 at 1:30 p.m., in the Board of Directors Room.

### 2.3 WATER CONSERVATION TASK GROUP

The in-house Water Conservation Task Group, following preparation of the Draft 1985 Water Conservation Plan, continued to review and respond to comments submitted by interested parties, and to edit and prepare the final plan. During 1986 the Task Group reviewed the progress on the 1985 programs. Exhibit 3, lists notes on meetings held during 1986. Highlights of activities reported and discussed at these meetings are as follows:

1. Implemented the Demonstration Tailwater Recovery Program. Five tailwater recovery systems have been installed and are in operation.
2. Measurements for various programs, including purchasing, testing, and installing electronic recorders.
3. Grant and Loan applications.
4. USBR/IID Cooperative Studies.
5. Coordination with Parsons Water Resources.
6. Special studies: Lateral Fluctuation, Modified Demand, Irrigation Scheduling, etc.
7. Preparation of 1986 budget.
8. Review of progress on all water conservation programs, including concrete lining and tailwater monitoring.

## Water Conservation Task Group Notes

January 10, 1986

Tailwater Recovery - four installations are completed. The Nilson System will begin as soon as District crews can pull off of other work. The hay that was on the right-of-way has now been moved.

Doug will contact Steve Scaroni; the pipe is available for the Scaroni project. The schedule is to complete six installations.

Our goal will be to complete the Nilson System on or about February 1, 1986. Assuming Scaroni will execute the agreement, the goal will be to complete his installation on or about March 1, 1986.

Field Day - Doug Welch reported that 6 members of the Water Conservation Advisory Board held their regular meeting at the Veysey Ranch to observe the tailwater system in operation there. Although the pump was not running, due to minimal tailwater in storage, the system was explained by John Veysey and Doug Welch and many questions were asked and answered.

Tentatively, the task group recommends that a tailwater recovery field day be scheduled for March with widespread notification.

Lateral Fluctuation Study - Jesse Silva distributed his memorandum on modeling, dated February 2, 1986. It was reviewed and discussed briefly.

Further meetings with Parsons are scheduled next week.

Bob Lang will be working closely with Parsons on this project. We will continue to install recorders. Jesse is working on a work plan and inventory which should be completed within two weeks or so.

East Highline Studies - Bradley reports that he is accumulating data at major checks on the East Highline Canal. We are Awaiting further information from the USBR.

Irrigation Scheduling Program - Doug Welch reported that he worked closely with the cooperators during the last two months or so and kept several from irrigating too soon. It was noted that those that didn't follow his advice had excessive tailwater. He reported that he now has 37 growers and 13,790 acres in the program.

1986 Program - Coordination with Parsons - A meeting is scheduled for next week with both Parsons and the USBR.

Other - Bradley reported that all of the operational discharge stations randomly selected are being recorded continuously.

Doug suggested that Denise attend the Coachella Field Day on January 17, 1986, so that he could meet with Parsons here.

George reported that the schedule for concrete lining is as follows:

January - Wisteria  
February - Trifolium Extension  
March - Rockwood

February 7, 1986

Dick Palmer of Parsons has talked to individual members of the Task Group about a proposed incentive program. He is scheduled to present the proposal to the Water Conservation Advisory Board on February 13, 1986.

Mr. Shreves has asked Doug Welch to present the proposal to the Board of Directors on February 18, 1986.

Jesse Silva reported that Water Engineering is furnishing substantial records to Parsons and Environmental Sciences for the EIR.

It was reported that the pipeline for the Nilsen tailwater recovery system is scheduled to be installed next week. Work will continue until the installation is completed.

Protective relays have been replaced on two of the larger pumps which were previously cutting out.

Doug Welch reports continued problems with irrigators pulling grade boards on tailwater structures eliminating the record. Jesse Silva will write a follow-up letter to Steve Scaroni advising him to respond by March 1, 1986, whether he wants to participate in the tailwater program.

Dr. Charles Burt is scheduled to visit the District on February 12, 1986. Parsons has been contacted and will be present. Dr. Burt will make a presentation on the work he has done over several years on System Automation.

A tentative schedule was discussed to complete the Water Conservation Plan update, with June 1, 1986 being set as a goal.

The 1985 Water Report will be printed soon. Tables from that report will be used in the Plan update. The general format was discussed, the main elements being:

- a) Progress during 1985, including work by Parsons.
- b) The 1986 program, including progress during the first quarter.

c) Suggested new programs for consideration.

A brief discussion was held regarding incentive programs. It was suggested that an escalating rate structure would be the quickest to implement. Any program based on measuring deliveries and tailwater would be expensive and would take considerable time to implement.

The group was requested to be prepared to suggest alternative incentive programs for consideration by the proposed Incentive Subcommittee.

Silva, Bradley and Welch were requested to prepare inventories of measuring stations and recorders installed for each of the several water conservation programs, and submit same by the next meeting. It is estimated that we have approximately 40 recording sites installed and operating.

Doug Welch reported that he is having trouble getting several landowners to sign the permission letter of agreement, allowing us to install broadcrested weirs and recorders on head ditches and tailwater structures. He was requested to compile a list of those unwilling to sign the agreement. Doug Welch passed out a graph of flows on two checks located on Myrtle Lateral which demonstrate the type of records we are trying to develop (copy attached).

March 7, 1986

Tailwater Recovery Program - The Nilson system is complete except for the power connection.

Steve Scaroni has returned the signed agreement form. The design is complete and materials have been ordered.

Veysey System - Doug reported that there will be two or three more irrigations on the sugar beets.

Benson System - Doug reports he is getting very few measurements as a result of too much tailwater and the complications of the system (tailwater from other fields, tailwater recovery being put on other fields; removal of grade boards by irrigators, etc.). There are undetermined flows going to the drains.

Regarding a field day, Doug Welch was urged to attempt to set a field day in late March or early April. A 10.00 a.m. time was suggested.

Water Conservation Plan Update: Twogood presented an outline of subject items (copy attached), for update of the water conservation plan. A proposed target date is June 1, 1986. George Wheeler has been instructed to review the 1985 Water Department Report for record material for the update.

1986 Program. (a) Loan Application: Jesse Silva has been in touch with Don Heath of DWR, who reported to him that there will be approximately 1 week delay in the decision on the loans, from this date.

(b) CIMIS Grant. Doug reported that Patty Seamstram contacted him advising that they need a resolution supplementing District Resolution 52-85. Doug will check on this.

(c) USBR Cost-Share Program: Jesse Silva reported that the District's matching costs are being computed to determine the payment due to the USBR.

Recorder Inventory: Bradley presented the group two inventory lists. The first lists the East Highline stations and the second lists stations being monitored for the operational discharge study (random systemwide locations). Copies of these lists are attached. Bradley also submitted a table showing the East Highline annual losses for the period 1964 through 1985 (copy attached).

Doug Welch presented a complete list of recorder locations for the irrigation scheduling program, as well as the lateral fluctuation study, altogether the lists show the location of 172 recorders (copies attached).

5. Other. (a) Doug Welch advised the Task Group that he has had trouble getting a few landowners to sign the standard letter granting permission to the District to enter property. A few landowners are reluctant to sign because of the 'third or fourth paragraphs of the letter which was approved by the District's legal counsel. Doug will check with Mr. Carter to see if these paragraphs can be modified or deleted.

(b) Doug Welch also presented a graph showing tailwater for the irrigation on February 5, 1986, to deliveries on Newside 30A and 33 (Veysey pumpback), copy attached.

Twogood passed out copies of Doug Welch's quarterly report for the quarter ending 12/31/85, to the members of the group that had not previously received a copy.

Twogood furnished copies of a letter dated October 7, 1985, from Professor John Merriam and advised that Mr. Merriam will be here on March 20, 1986, and will meet with the task group, Parsons people and others, in the Water Department conference room at 8:30 a.m.

The group briefly discussed the Parsons incentive program and members were asked to provide suggestions to Welch and Twogood, who will represent the District on the Water Conservation Advisory Board subcommittee.

April 21, 1986

Tailwater Recovery Program. The pump for the Scaroni pumpback system has been ordered - anticipated delivery 30 to 60 days.

The Benson tailwater system problems were discussed by the task group. It will be necessary to install valves or caps on the discharge end of the system to avoid damage to the pipe such as occurred recently. The irrigator also broke the cast iron valve handle. A replacement has been ordered. All necessary repairs have been made, and a cap for the discharge line will be installed. Doug Welch reported that the Westmorland office failed to advise his office that Trifolium 8, Delivery 153 (Mallory pumpback), was running recently. As a result, our records are incomplete, although we have total flow values.

Lateral Fluctuation Study: A trial run on the Myrtle lateral has been scheduled for next week, April 28. Karen Holdsworth is in charge for the Water Department. Doug's crews will be collecting on-farm records. Doug reported that the farmer on the end of the Myrtle (Slater) still has not given permission to install broad-crested weirs in his head ditch. An effort will be made to accomplish this.

CIMIS. A portion of the recorders recently ordered will be charged to the CIMIS program. At this moment the District has not received a copy of the executed contract.

DWR Loan - Status: George Wheeler reported that the District has still not been notified on the award of a loan to the District.

Water Conservation Plan Update: Twogood reported that material has been gathered for the update such as minutes of this task group, minutes of the Advisory Board, and other information related to the District's water conservation program during 1985 and 1986. George Wheeler was given the assignment to assemble appropriate tables from the 1985 Water Department report for inclusion in the update.

Other: (a) Twogood will distribute copies of the 1986 1st quarter reports (water conservation) to the members of the task group. (b) George Wheeler asked for comments from the task group members on the revisions to the rules and regulations sections on water deliveries (Regulation Nos. 8 and 9). The task group members had no specific comments but suggested that George should incorporate those suggestions from the divisions and move ahead with obtaining approval of the revised regulations.

(c) George Wheeler discussed the problem of keeping records on water moves. Although there is some improvement there is still water being moved by water users without the knowledge of District personnel. It was suggested that flagrant violators be assessed the gate moving charge.

(d) George reported that two requests have been received recently, one by Keith Sharp (informal) and a written request from Michael Morgan, requesting District participation in tailwater recovery systems. George distributed a water department analysis in response to Michael Morgan's letter (copy attached).

It was moved, seconded and unanimously approved, that the task group recommend that the District waive the standby charge only, for electric energy used on all tailwater recovery systems using electric pumps. Twogood will convey this information and recommendation to the General Manager.

May 2, 1986

1. Lateral Fluctuation Study. Bradley reported that recorders are operating at the head of all laterals.

Silva reported that all the checks on the Myrtle have recorders.

Welch reported that most deliveries and tailwater structures have recorders. This week was the beginning of a continuous run of several weeks. As recorders become available and are installed, the program will be expanded to the Munyon and other laterals. Bert Clemmons, SCS, Phoenix, AZ, will be here Monday to review and discuss the program.

2. Tailwater Recovery. Wheeler reported that the tailwater reservoirs having smaller than 18" pipes will be replaced. In one case the grade will be changed on an existing 18" pipe. There are continuing problems on both the Benson and Smith systems, where grade boards are being pulled or outlets changed by the irrigators. Caps have been ordered for the pipe outlets. Welch is collecting water samples for both Benson and Smith.

The divisions will perform necessary maintenance on all the systems except the pumps, which will be maintained by the shops. The group discussed the District's furnishing engineering design for tailwater recovery systems. Twogood will prepare a memo to the General Manager recommending that the District provide free engineering for tailwater recovery systems.

3. CIMIS. The group was advised that the contract had been executed, the effective date being April 17. Also, that Steve Knell has been hired to manage this program and will report to work May 27. Welch will check with Seamstrom regarding charges for recorders recently purchased (prior to April 17), since recorders ordered between now and June 30 would not be received prior to that date.

4. Water Conservation Plan Update. It was decided to cut off records for this report on April 30, 1986. Wheeler reported that most of the data assigned to him had been assembled. Twogood requested that each member transmit the assigned data to him by memo.

Wheeler also submitted a "Current Status of Hydrilla/Grass Carp Research Report," prepared by Randy Stocker for possible inclusion in the update. The other members reported that they will attempt to meet the May 9th goal for submitting the assigned data.

5. Other.

A. Twogood discussed a letter from the State Water Resources Control Board requesting preliminary indications of intent to file for low interest loans on drainage management facilities. He advised that a response will be prepared indicating the District's interest in such a loan.

B. Twogood discussed the draft letter to Mike Morgan advising him of Board approval on charging the power demand component to the District's water conservation fund.

The group generally concurred with the letter.

C. DWR Loan Status. Jesse reported that he has been advised by telephone, by DWR staff member, that a decision has been made but he could not reveal the results. We will receive a letter within a few days.

D. Parsons Hydraulic Model. Silva reported on the meeting with Parsons earlier this week. He and Bob Lang will prepare some comments thereon. Welch, by memo dated April 29, 1986, submitted his comments. The consensus is that Parsons should complete the hydraulic model, but not do further work on the demand model.

E. Twogood advised the group that the balance in the water conservation fund was extremely low on March 31, 1986, as reported by Kris Fontaine at the April 29, 1987 Board Meeting, being approximately \$250,000.00. Furthermore, costs for concrete lining during the first quarter, approximately \$750,000.00, will be charged during the current quarter, although accruals at \$1.75/AF should gross about \$1.5 million in this period. Funds available for water conservation will remain critically low until after mid-year.

July 24, 1986

1. Plan Update - Mr. Twogood distributed schedule for completion of June 1986 Water Plan Update.

Goal is to complete assembly of 10 copies by July 10, 1986 for Board approval on July 15, 1986.

Consensus that goal will be met. Twogood assigned Wheeler the task to complete assembly after final report is delivered to him on/before July 3, 1986.

2. CIMIS - Doug furnished draft of Quarterly Progress Report being sent to DWR (copy attached).
3. DWR Loan - Jesse reports letter from Heath (DWR) coming per telephone contact.

Twogood mentioned need to be preparing for 1986 application since Proposition 44 passed.

4. Other - (a) Scaroni pumpback

Doug and Jesse plan meeting in field with Scaroni

(b) Irrigation Scheduling - Doug reports progress report on irrigation scheduling is due. He will provide brief data for inclusion in Update, and furnish copies of complete report to Task Group when completed. Need to publicize results was discussed.

July 24, 1986

1. Update - Status. No change.. County suit dropped on condition each party pays own legal fees.
2. CIMIS. Steve in charge - Irrigation scheduling program (computer program "Roy" received, demo \$100). Full program will cost about \$1500. Irrigation Handbook (outline attached), proposed for (1) education,. (2) irrigation training.
3. DWR Loan. Letter and Trifolium Reservoir sent. Jesse is assembling soil information for DWR.

Concrete Lining, including EIR (category exempt).

Lateral Discharge recovery - the design is complete - drawings will be ready to submit on schedule (i.e., shortly after August 19).

### 2.3 Water Conservation Task Group

An in-house group composed of administrative and technical staff was formed to

July 24, 1986 (Cont'd.)

coordinate water conservation activities. This group carries out administrative policies and provides direction for the technical staff. A list of activities is summarized under Exhibit 3-3.

4. Lateral Fluctuation. Debugging hardware and software, collecting Preliminary report should be ready by September 1.
5. Incentives. Dick Palmer (Parsons) is preparing a draft of recommendations, including 7 points, to present to the Advisory Board August 7.
6. 1986 Loan Program. Letter's from Jesse and Twogood, regarding the drainage portion, were distributed to the Group.

A memorandum to the Board of Directors recommending application for a water conservation loan will be prepared by Twogood, at the appropriate time.

7. Other. EIR - Parsons will be submitting the report July 25, 1986. Work Sessions with staff and Parsons will be scheduled for August 12 and 13 at 9.00 a.m. Copies of the July 22, 1986, memo distributed to Water Conservation Task Group. Twogood suggested that Randy Stocker should be involved.

ASCE article attached.

East Highline. A work plan in relation to the proposed transmission line was prepared by Jesse and submitted to Mr. Wilson.

1. CIMIS Program. A letter is being sent by Mr. Shreves to DWR requesting reinstallation of the CIMIS Station formerly located in Westmorland.

Doug Welch reported that a DWR representative will be down next Wednesday to look at sites for the reinstallation. The proposal has been made that the DWR will reinstall that station, provided the District installs a new station in the southwest area of the District.

Twogood reports that the McKim station will be relocated to Verde School. The ET information furnished by the District is now being printed in the Imperial Valley Press.

2. DWR Loan. On or about September 2, 1986, the additional information requested by DWR in their July 9, 1986, letter should be transmitted. Twogood reports that he will be sending a request to legal counsel to respond to Items E.1, E.2, and E.3.

Bob Lang, in Jesse Silva's absence, reported that site selection and design for the spill collector is continuing, but will not be completed prior to September 2, 1986. Similarly, additional work will be necessary for the South Alamo lining project. Twogood advises that he will prepare

JULY 24, 1986 (Cont'd.)

a transmittal letter to be sent on or about September 2, 1986, transmitting as much information as possible and requesting that approval be given to go ahead on the Trifolium Project.

3. Lateral Fluctuation. Bob Lang has been in Imperial this week to help with the programming of data collected from the lateral fluctuation study to develop reports and graphs in usable form. The gathering of data will continue.

Bradley reports that Water Control hydrographers will rate 9 broad-crested weirs this week. Doug Welch and Jesse Silva have been planning for the installation of some portable weirs to control backwater on delivery gates. The tentative schedule is to install these in November.

4. 1987 Budget. Twogood passed out excerpts from the 1986 update (pages 85, 87, and 88) which are to be used for preparing the water conservation portion of the water department budget. George Wheeler furnished copies of pages 11, 12, and 13 of the operating report (financial data) for the month ending 7/31/86, which are to be used for preparing the budget.

The consensus of the task group is that the data collection programs must be continued, as well as the pumpback, tailwater monitoring and irrigation scheduling.

With reference to the USBR/IID cooperative studies, it was suggested that the Bureau needs to be contacted and asked to come to the Valley to discuss this program. George Wheeler will talk to Bob Wilson about this.

5. Other. Some general discussion concerning the various programs centered on two main subjects: (a) the lack of cooperation by Benson Farms in the pumpback study, and (b) the reporting of changes in deliveries. Several farmers are moving water several times a day, for which there is no record.

September 12, 1986

a. Lateral Fluctuation - Jesse Silva distributed a copy of an Abstract entitled "The Effects of Main Supply Canal Fluctuations on Distribution Laterals" (copy attached). This is an abstract of a paper to be presented by Karen Holdsworth and Bob Lang at a future ASCE conference.

Jesse Silva reported that several graph programs have been developed to show fluctuation on the Myrtle and Munyon laterals. The results thus far show that there are fewer fluctuations of lower magnitude at the Myrtle heading than at the Munyon; the Myrtle being upstream from the Myrtle check and the Munyon below.

September 12, 1986 (Cont'd.)

Bradley reports that metering of the weirs is continuing. Similarly, Welch reports that tailwater measurements continue to be collected for this program. Additional broadcrested weirs need to be installed on several head ditches.

The report being prepared in Water Engineering will cover the following topics:

1. Purpose
2. Program
3. Results
4. Goal for 1987

b. Tailwater Recovery:

Benson System: Only a small portion of the tailwater is being recovered. Tailwater discharge to District drains continues high.

Smith System: It has been reported that the pump shuts off periodically. Checks by District personnel have not determined any problems, so far pump has been running during each observation.

Mallory System: Pump not being used. Welch has encouraged him to use the pump especially during one last cotton irrigation. The pond drains by seepage between irrigations.

Nilson System: Not currently irrigated.

Veysey: Flat flooded north field, operated pump with only 5% tailwater.

Scaroni: Wheeler reports that pipe and pump will be installed within the next few weeks; awaiting completion of other projects.

c. East Highline Study - Task Group was referred to USBR letter dated July 7, 1986,. schedule attached thereto indicates work to be completed on or about June 30, 1987.

Jesse and Bradley indicated that additional data entry help may be needed to input the 1985-1986 data for submission to the Bureau.

2. 1987 Budget. A copy of the budget request for the Water Conservation Section was distributed to members. The total request amounts to \$688,000. Twogood and Silva will prepare a recap of the total Water Conservation budget recommendation.
3. Other. EIR Schedule - Twogood distributed copies of the proposed schedule submitted by Parsons for the completion of the EIR. Final action by the Board of Directors is scheduled for November 4, 1986.

October 30, 1986

1. STATUS OF PROGRAMS

- a. Tailwater monitoring - Doug reported that farmer cooperation is not what it could be. He has sent a letter to the farmers concerning this. Discussed the number of farmers in the program and how long they had been involved.

Doug's office is working on the 1985 tailwater monitoring report. They got behind on data analysis during Denise's maternity leave.

- b. Tailwater Recovery -

VEYSEY SYSTEM: He is the only one cooperating 100%

BENSON SYSTEM: This system is not being operated properly. Mr. Shreves asked Doug to write up a report on this problem so that he can review it and contact Benson.

MALLORY SYSTEM: They keep filling up the pond but they don't turn on the pump. The pond doesn't spill, but in two weeks most of the water seeps out.

J.R. SMITH SYSTEM: They have been using the system but complain that the pump does not work right. Doug's people have checked it and haven't found anything wrong.

NILSON SYSTEM: This field is under new management and the pumpback system is not being used.

- c. Lateral Fluctuation Study - Karen gave a slide presentation covering some of the finding to date. These include:

°Fluctuations during a 24-hour delivery period are primarily caused by change orders.

°The level of the EHL is relatively stable (68% of the time flux is within  $\pm 1$ ", 95% of the time flux is within  $\pm 2$ ", 99% of the time flux is within  $\pm 3$ ").

°A fluctuation of 3" would cause a 4% to 5% change in lateral flow. In an extreme cases, a 8" increase in the level of the EHL resulted in a 12% increase in flow.

- d. EHL/USBR - Bradley reported that data are being entered into the computer to send to USBR.

October 30, 1986 (Cont'd.)

- e. Irrigation Scheduling - Clyde Shields provides an irrigation scheduling service and he wants the District to contract with him. It was pointed out that the District is collecting data for research, not just providing irrigation scheduling. Clyde Shield's service will not fill the District's need for tailwater monitoring.
- f. CIMIS - Shreves would like Doug to prepare a letter to farmers explaining CIMIS. Letters have been sent to the newspapers concerning CIMIS but they have not been printed yet.

2. STATUS OF DWR

Jesse Silva recently sent DWR a letter containing the additional information that they requested.

3. 1987 BUDGET

\$1 million will go to concrete lining and the rest will be divided between other projects.

4. TASK GROUP STATUS - Shreves would like the group to continue meeting once per month to make sure things get done and to keep up with data findings.

5. OTHER -

George handed out a sheet concerning the "Appeals Procedure" for tailwater assessments and gate changes (see attached). It was suggested that the requirement to appear before the Board be added.

It was also noted that the Board is too liberal in waiving these assessments. Doug stated that the Board should be required to record the reasons for their decision. Shreves would like memos on those cases for which assessments have been waived so he has data to take to the Board, if this is a chronic problem.

George passed around a pamphlet on low head hydro production.

## SECTION 3

### 3. PLANNING ACTIVITIES

#### 3.1 OVERVIEW

The Board of Directors, on May 17, 1985, authorized Parsons Water Resources to proceed with initial studies. Parsons' request for approval to proceed with the work, dated May 10, 1985, described seven tasks as follows:

Task No.	Description
1000	Program Management, Control, and Administration
1020	Program Procedures
2000	Water Requirements and Availability Study
4000	Water Transfer Study
5000	Water Conservation Implementation Plan
6000	Program Studys and Reports
7000	Program Support Services (As required)

Parsons submitted monthly progress reports detailing the work. The following paragraphs summarize Parsons' work for each reporting period, as presented in the monthly or periodic reports for 1986. Please refer to the 1986 Water Conservation Plan Update for work completed in 1985.

Report No. 7, April 1, 1986

- ° On December 10, the proposed CY 1986 budget and scope of work were presented to the Board of Directors. After a discussion of several funding and scope of work alternatives, the Board of Directors approved a reduced level of work for Parsons in 1986. Authority for Parsons to proceed with this work was provided on December 12, 1985.

- ° At the board meeting on December 10, Parsons Water Resources was selected by the Board to assist the District in the preparation of IID's Program Environmental Impact Report. Authority to Proceed with this work was provided to Parsons on December 30, 1985.
- ° Parsons continued implementation planning work in December, focusing primarily on development of the mathematical model of the irrigation system.
- ° On January 17, a program review meeting was held with the District staff to discuss and confirm tasks and schedules. This meeting resulted in several changes to the 1986 schedule, confirmation of various work scopes, and the District's decision to cease work on the computer-aided design activities pending evaluation of other mapping alternatives.
- ° Parsons actively participated in all discussions and negotiations between the IID and MWD concerning the initial transfer of 100,000 AF/year of conserved water. Meetings were held on February 14 and March 5 in San Diego, and on March 12 in Pasadena.
- ° Developed a draft proposed amendment to the 1932 Water Diversion and Delivery Contract between the District and the U.S. Department of the Interior (DOI).
- ° On March 27, a presentation was given by Parsons at a public meeting in El Centro to obtain public understanding and support of the Water Conservation Program.

### 3.2 WATER REQUIREMENTS AND AVAILABILITY STUDY

The purpose of the "Water Requirements and Availability Study" is to quantify the Imperial Irrigation District's present and future water needs and to determine the additional water that could be made available for use by others.

This determination was based on an analysis of Colorado River water supply to the District, future water requirements of the District to the year 2010, and water conservation projects and measures that could reasonably be implemented over a 12- to 14-year period.

Parsons submitted the final report entitled "Water Requirements and Availability Study" to the District on November 8, 1985, in accordance with the April 19th Letter of Intent. The study had three major objectives:

1. Define water requirements that are estimated to exist during the planning period (1985-2010).
2. Examine a broad array of water conservation methods to determine the technical and economic feasibility of those methods, to analyze their relative value, and to determine which should be implemented and to what extent.
3. Determine the amount of conserved water that can be made available for use by others, considering water supply requirements and implementation of conservation measures.

The findings of the study are:

1. The IID share of the 3.85 million AF/year allocated to California's agricultural agencies in the Seven-Party Agreement will be available with greater than 99 percent certainty through the year 2010.
2. The current baseline water demand within the IID is 2,770,000 AF/year (considering the conservation that has already occurred). This baseline amount represents the most probable demand, based on current and historical evidence.
3. If no further conservation takes place, the projected baseline water demand for the year 2010 is 3 million AF/year.
4. (a) The total amounts of water that could be conserved through new economically feasible IID projects, and that which has already been conserved by past IID projects, are estimated to be:

<u>Time Period</u>	<u>Amount Conserved (AF/year)</u>
Pre-1986	138,000
New projects (1986-1997)	358,000
Total	496,000

- (b) The pre-1986 conserved amount of 138,000 AF/year can be considered as available for use by others now.
- (c) The 358,000 AF/year estimated to be conservable by new projects is based on undertaking a major effort to implement the more cost-effective conservation actions during the period 1987-1998.

5. (a) When the baseline water requirements for the year 2010 are adjusted for conservation measures, the net demand would be 2,642,000 AF.  
  
(b) The IID demands for water in year 2010, assuming implementation of the new program and considering the pre-1986 conservation measures, would be less than the IID's Seven-Party Agreement allocation.
6. There is good quality groundwater with a volume exceeding 700,000 AF available for use as a reserve during periods when demand exceeds supply. The capital cost of developing a strategic reserve capable of supplying 300,000 AF/year (the amount of reserve required during a year of maximum planning demand) is \$32,000,000, which has been included in the cost of the conservation program.
7. (a) The estimated capital cost of the new (post-1985) conservation program is \$600,360,000 (in 1985 dollars).  
  
(b) The largest cost item of the new program is construction of a desalination plant, estimated to cost \$335,000,000. The merit of constructing this high-cost item would have to be assessed carefully, considering benefits, costs, and financing means.
8. The amount of water potentially available for use by others will be the amount that has been and will be conserved, up to the total limit of 496,000 AF/year.

### 3.3 WATER TRANSFER STUDY

Parsons submitted the final report entitled "Water Transfer Study" to the District on November 18, 1985.

The "Water Transfer Study" was intended to identify and evaluate potential State of California transfer candidate water agencies that could beneficially use additional water that could become available as the result of the District's water conservation efforts. This determination was based on an evaluation and analysis of water users within 12 hydrologic study areas in California, water supplies and demands through the year 2010, water conveyance capacities and constraints, operational compatibility, cost of alternative water supplies, and a willingness to enter into a transfer agreement. The Executive Summary presents principal findings and an overview of the study.

The conclusions of this study are as follows:

1. The demand for water in Southern California will continue to grow over the next 25 years as a result of population increase. This is particularly true in the south coast plain.
2. Water supplies in Southern California will be adversely impacted by the increasing diversion of Colorado River water to Central Arizona.
3. California laws and policies concerning water conservation and beneficial use support the transfer of District-conserved water.

4. Transfer of conserved water surplus to local needs from the Imperial Irrigation District is feasible.
5. The most appropriate transferees to receive conserved District water are located in the south coastal plain of Southern California.
6. The most advantageous and easily implemented water transfer arrangement would involve transfer of District-conserved water to the MWD. Transfer to the San Diego County Water Authority would also be feasible but would probably be more difficult to arrange. Although more difficult, transfer to Kern County through a third-party exchange system is feasible if economic conditions change.
7. Receiving conserved water from the District is an attractive alternative to other sources because of its present and future firm availability, location, and relative cost.

#### 3.4 WATER CONSERVATION IMPLEMENTATION PLAN

The Water Conservation Program Implementation Plan presents, in a single document, the comprehensive implementation strategy, schedules, project descriptions, and cost data necessary for the cost-effective and efficient execution of an expanded Water conservation Program. The plan covers all proposed water conservation projects, both in the District's system and on-farm, that are currently planned to be accomplished by the IID and others over the 12-year period

beginning in 1987. The plan will be periodically reviewed, expanded, and modified so that it will continue to serve as the primary implementation planning document for accomplishing the work included in the program. The Water Conservation Implementation Plan provides:

- (1) A comprehensive baseline implementation plan for the cost-effective and efficient execution of the District's expanded Water Conservation Program.
- (2) A program work breakdown structure to enable the District to plan, budget, control, and report work and progress during program implementation.
- (3) Project descriptions and scopes of work for other activities in sufficient detail to facilitate the timely execution of the work tasks by the District on receipt of funds.
- (4) Budgetary cost data and technical information to facilitate work authorization and budget approval by the IID's Board of Directors prior to individual work elements being implemented.
- (5) A descriptive baseline document that will assist the District in documenting and determining a reasonable value for transferred conserved water.
- (6) Baseline data to assist the District in determining the IID's program support requirements necessary to implement the program.

In preparing the Implementation Plan to fix preliminary schedules and define work tasks, two basic assumptions were made with respect to the timing and amount of revenues from the transfer of up to 250,000 AF annually of conserved water. The first assumption was that the initial Water Transfer Agreement for the transfer of 100,000 AF annually would become effective on January 1, 1988, and the monetary value of the Transfer Agreement would be sufficient to finance a pro rata portion of the total program elements such as new construction projects, operations and maintenance attributable to water conservation, on-farm incentive measures, and environmental mitigation projects. The second assumption was that the subsequent transfer of up to an additional 150,000 AF annually of conserved water was assumed to become effective beginning in 1990 for the next 100,000 AF and in 1992 for the remaining 50,000 AF. Because the planned program schedules and cost are interactive with the price and other terms of Water Transfer Agreements, a Water Pricing Model was developed to assist in establishing a value for conserved water and in preparing revisions to this Implementation Plan. The Water Pricing Model is included in the appendix to this plan.

The plan is divided into four sections:

° SECTION 1: Program Implementation Plan Overview

Collectively, this section presents the overall strategy for implementation of the program. An overview of the projects and other water conservation measures that are included in the expanded water conservation program is presented. The project descriptions, schedu-

les, and cost data are summary in nature. A discussion of potential means of financing the program is also included.

° SECTION 2: Comprehensive Project Schedule

Schedules are provided for each specific project and other water conservation activities planned to be accomplished during the first five years of the program, beginning in 1987. Additional program data is also provided for each work element in order to assist the District in planning and controlling the execution of the work.

° SECTION 3: Detail Project Descriptions

Detailed project descriptions are provided for each project schedule to be accomplished during the first five years of the program. The scope of work and general description of each project, along with other relevant data, are presented. In addition, costs, cash flow requirements, environmental compliance considerations, and real estate requirements are discussed.

° SECTION 4: Program Cost Data

This section presents representative program cost data that is required for both budgeting and cost control during the first 5 years of the program's execution. A program cost model was developed to make cost information concerning various aspects of the program immediately available to the District for analytical and budgeting purposes.

### 3.5 WATER CONSERVATION PROGRAM ENVIRONMENTAL IMPACT REPORT (EIR)

At the regular meeting of August 13, 1985, the Board of Directors approved the Environmental Assessment and Initial Study for a proposed 100,000 AF water transfer per the Draft MOU, and authorized the preparation of a Negative Declaration covering the project.

Subsequently, the documents were appropriately prepared and distributed for comments. Although an official public hearing on the Negative Declaration had been set for October 29, 1985, sufficient comments and questions were received during meetings and the public hearing on September 30, 1985, on the MOU, to indicate that an Environmental Impact Report focused on the proposal should be prepared.

The Draft EIR was presented by Parsons to the Board of Directors on April 15, 1986. Parsons' representatives presented an overview of the DEIR. The Board accepted the DEIR, authorized distribution, set a 60-day period for review and comment, and scheduled a Public Hearing for April 28, 1986, to receive public comment on the report.

The Draft EIR contains ten chapters and nine appendices, and covers the following major subjects:

- ° Background Information
- ° Description of Proposed Conservation Program
- ° Initial Transfer
- ° Water Conservation Program Alternatives

- ° Existing Conditions
- ° Beneficial and Adverse Impacts
- ° Mitigation Measures
- ° Growth-Inducing Impacts
- ° Short-Term Beneficial Uses vs. Long-Term
- ° Environmental Impacts

The Executive Summary of the EIR offers a brief description of the significant environmental effects and mitigation measures. Only a few of the impacts will be listed here as follows:

1. The first 100,000 AF/year of water transferred would not have any significant environmental effect because this water has already been conserved and is not entering the IID's system.
2. Water conservation will ensure that the IID's water availability is increased by conserving 500,000 AF/year and transferring only 250,000 AF/year.
3. Reduction of the current level of the Salton Sea, by reducing losses and, therefore, inflow to the Sea will reduce penalty payments by the existing high sea level.
4. Overall, there will be local and regional economic benefits from conservation expenditures, lower farm production costs and the inflow of money from outside sources for operation and maintenance of the irrigation system, and payment of costs for environmental mitigation measures.

### 3.6 USBR/IID Cooperative Study

In other planning activities, the District participated in a cooperative study described on page VI.22 of the Plan. It has been undertaken in accordance with the three-year agreement between the USBR and the District executed June 2, 1985. The USBR has designated the study "Concrete Lining and System Improvement Study" (CLSI). The work program is estimated to cost \$972,000, with the District's share being \$486,000 in payment or in-kind services over the three-year period.

Prior to the agreement, a staff-level meeting was held on March 20, 1985, to develop the scope of work. The letter dated April 1, 1985 to Mr. Shreves, Imperial Irrigation District's, General Manager from the Bureau (Exhibit 4) describes the outcome of that meeting. On June 5 and 6, 1985, Bureau personnel again met with District staff to discuss the status of the study. Exhibit 5 is a Memorandum regarding that meeting.

For the East Highline Canal (EHL) part of the CLSI loss study, three meter stations were activated to measure flows. The stations are located on the EHL Canal below Lateral 11 Check, below Oak Check, and below Nectarine Check. These flow measurements will be used to rate the check gates.

Below Lateral 11 Check a meter boat was installed. This station was activated August 1, 1985, and has been metered daily 74 percent



# United States Department of the Interior

BUREAU OF RECLAMATION  
LOWER COLORADO REGIONAL OFFICE  
P.O. BOX 427

BOULDER CITY, NEVADA 89005

APR 1 1985

IN REPLY  
REFER TO: LC-757  
453.

Mr. Charles L. Shreves  
General Manager  
Imperial Irrigation District  
P.O. Box 937  
Imperial, California 92251

Dear Mr. Shreves:

On March 20, Messrs. Joseph Kitchen and Michael Stuver of my staff met with Messrs. Beuford Bradley and Jesse Silva in your office to discuss initial work items to be performed by the Imperial Irrigation District (District) as part of its contribution to the Canal Lining and System Improvement Study. Initial work items include rating several control structures and measuring deliveries to selected laterals along the East Highline Canal. Methods for making selected historic operational data available for analysis were also finalized. Work to be accomplished is summarized below.

Five water control structures along the East Highline Canal will be rated by your Water Department staff to develop flow versus pond elevation rating equations. The structures to be rated are:

1. Check 11
2. Weir 16
3. Oak Check
4. Nectarine Check
5. Flowing Wells Check

Twenty-five laterals diverting from the East Highline Canal were selected for installation of measuring and recording devices to measure flows delivered to the laterals. Several of the selected laterals are presently equipped with measuring and recording devices to make measurements for other District studies. These sites are adequately equipped for our needs. A few other laterals situated between the Oak and Nectarine checks cannot be equipped with measuring devices. These laterals will be measured at approximately 4-hour intervals by the hydrographers and patrolmen as they make their rounds.

The selected laterals that the District will equip with measuring and recording devices are as follows:

1. Lateral 12
2. Lateral 13
3. Lateral 14
4. Lateral 16
5. Palm Lateral
6. Orchid Lateral

7. Osage Lateral
8. Oak Lateral
9. Moss Lateral
10. Magnolia Lateral
11. Mesquite Lateral
12. Maple Lateral
13. Mullen Lateral
14. Myrtle Lateral
15. Myrtle "A" Lateral
16. Munyon Lateral
17. Mulberry Lateral
18. Mulva Lateral
19. Mayflower Lateral
20. Marigold Lateral
21. Standard Lateral
22. Narcissus Lateral
23. Nettle Lateral
24. Nutmeg Lateral
25. Nectarine Lateral

A number of the Bureau of Reclamation's (Reclamation) water stage recorders, used on earlier studies within the District, are now on temporary loan to your Conservation Supervisor for use on the irrigation scheduling demonstration program. These recorders may be used as necessary to accomplish the above monitoring.

Selected historical operational data needed for the seepage loss analysis will be compiled on a micro-computer that Reclamation will provide. We anticipate having this machine, along with necessary data entry programs, available to setup in your water dispatcher's office in mid-April. Actual data entry would be accomplished during the next several months by part-time or summer employees hired by the District. We will provide initial training for these employees.

We appreciate the help your staff has provided to get this study started. Please feel free to coordinate with Mr. Joseph Kitchen, (702) 293-8468 or Mr. Michael Stuver (702) 293-8552 as needed to keep the study proceeding in a timely manner.

Sincerely yours,

*Roy Q. Gear*  
ACTING FOR  
N. W. Blummer  
Regional Director

*Memorandum*

LC-737/453.

June 18, 1985

UNITED STATES  
DEPARTMENT OF THE INTERIORBUREAU OF RECLAMATION  
LOWER COLORADO REGIONAL OFFICE  
P.O. BOX 427  
BOULDER CITY, NEVADA 89005

To: Regional Planning Officer

From: Mr. Michael D. Stuver, Hydraulic Engineer

Subject: Travel Report, Imperial Irrigation District Headquarters

1. Travel period: June 5-6, 1985
2. Travelers: Mr. Smith L. Patterson, Computer Equipment Specialist  
Mr. Michael D. Stuver, Hydraulic Engineer
3. Place or offices visited: Imperial Irrigation District, Operating  
Headquarters, Imperial, California
4. Purpose of trip: Deliver and install Datapoint computer in Imperial  
Irrigation District (District) office and train District personnel to enter  
historical operations data.
5. Synopsis of trip: On the afternoon of June 5, the computer system was  
installed in the Watermaster's office where the historical records are stored.  
After insuring that the hardware was working properly, initial orientation and  
training were provided to Mr. Carlos Z. Villalon and Mrs. Penny Kosciusko,  
District staff members who will supervise data entry. Both have had experience  
with the IBM PC computer and learned operation of the Datapoint very quickly.

Use of the data entry program was explained on the following morning. Several  
hours were spent entering actual historical data to familiarize Mrs. Kosciusko  
with program operation and data entry procedures. Several minor problems were  
found in the program during data entry but were quickly resolved and corrected.

On June 6, Mr. Michael Stuver met with District Water Department staff members,  
Mr. George Wheeler, Mr. Beuford L. Bradley, Mr. Jesse P. Silva,  
Mr. Carlos Z. Villalon, and Mr. Douglas Welch to discuss status of the Canal  
Lining and System Improvement Study. The following items were discussed.

East Highline Canal Seepage

Mr. Michael Stuver reported that (1) the computer and data entry program are  
ready to begin entering daily historical operational data, (2) the data entry  
program for hourly gate opening and pond elevation data will be developed within  
the next few weeks, (3) the seepage analysis computer program will be developed  
during the summer, and (4) field collection of design and environmental data has  
started. Mr. Stuver suggested that a field inspection of the East Highline  
Canal would be beneficial for the Reclamation personnel who will be developing  
the seepage analysis program. A short visit was tentatively scheduled for one  
day during the week of June 17.

### Recorder Installation

Mr. Bradley indicated that all but four recorders have been installed on the previously selected laterals. Broad-crested weirs must be constructed before the other four recorders can be installed. Water department personnel have started taking flow measurements to rate some of the small check structures on several laterals.

### East Highline Canal Check Structure Rating

Metering station installation is nearly complete for all check structures. No flow measurements have been taken yet.

### System Scheduling Demonstration Program

Operation of a typical system scheduling program was explained and potential benefits to the District were discussed. District personnel pointed out that some District operating practices like open-ended water orders would make system scheduling difficult to accomplish. In addition, the farmers' practice of ordering water for next-day delivery would minimize effectiveness of system scheduling. An opinion was expressed that farmers would always have to order water for next-day delivery because they can not know, even using the neutron moisture gage, when to schedule water any further in advance. (Experience on other irrigation projects has shown that irrigations can be accurately scheduled as much as four days in advance by using the neutron moisture gage). Concern was also expressed that numerous other District conservation programs would detract from the attention and emphasis that should be given to a system scheduling demonstration program. Therefore, it was mutually agreed that a system scheduling demonstration program would not be conducted as part of the Canal Lining and System Improvement Study. Further, the Water Management and Conservation Program funds previously set aside for the District demonstration program would be made available to support a demonstration program in another District.

### 6. Conclusions:

- (1) The East Highline Canal seepage study is progressing on schedule, and
- (2) the proposed system scheduling demonstration will not be conducted as part of the current study.

*Michael D. Stuebe*

cc: Charles L. Shreves, General Manager, Imperial Irrigation  
District, P.O. Box 927, Imperial, California 92251

of the time since that date. After a year of metering at this station it will become the upper measuring point for a monitored stretch of the EHL Canal, with Lateral 16 Weir being the lower point. The laterals between these two points currently are being monitored by water-level recorders. In addition to the loss study this station is also being used to determine the discharge at the head of the EHL Canal. This is necessary due to the lack of a satisfactory method to measure the discharge through the power plant.

The check gates at Lateral 11 check have already been rated, using the metered discharge that is being made daily. The rating table is being revised periodically as more meterings become available.

For the measurements below Oak Check, a meter boat was installed in the same manner as the one at Lateral 11 check. This station was activated July 19, 1985, and has been metered 93 percent of the time since that date. These meterings will be used to rate the Nectarine Check gates and provide data for the CLSI Study. In addition to the loss study these measurements have already been used to rate the gates for normal operations.

The records taken at these three main stations are being collected and stored in the Water Control Office and will be delivered to the U.S. Bureau of Reclamation (USBR) upon request.

For the EHL Canal loss study the following lateral headings are being

monitored using water-level recorders furnished by the USBR.

Lateral 12	Mullen Lateral	Marigold Lateral
Lateral 13	Myrtle Lateral	Standard Lateral
Lateral 14	Munyon Lateral	Narcissus Lateral
Moss Lateral	Mulberry Lateral	Nettle Lateral
Magnolia Lateral	Malva 1 Lateral	Nectarine Lateral
Mesquite Lateral	Malva 2 Lateral	
Maple Lateral	Mayflower Lateral	

Each overpour structure has been individually rated by taking several current meter measurements.

In addition to the water-level recorder measurements taken on these lateral headings, the hydrographers are recording all pertinent information observed, so that recorder sheets may be readily translated into discharge figures. They list any malfunction of the instrument, tampering with the gate or weir, and the amount of water being diverted to a delivery gate, if any, above the lower measuring point. These recorder sheets and information are being collected and stored in the Water Control Office and will be delivered to the U.S. Bureau of Reclamation when requested.

Historical water-flow records are being entered into a database using a microcomputer furnished by the USBR. As of December 30, 1986, hourly gage height records at all EHL Checks for the 12 years 1973-1984 has been entered into the database for final analysis by the USBR. In addition, average daily flows at the head of each EHL lateral above Flowing Wells, taken from daily log sheets, had been entered for the years of 1979- 1984. As of December 30, 1986, USBR

personnel were testing the computer program with about two years of records.

As a part of this study, annual records of flows in the EHL Canal have been analyzed to compute total losses. Table 10 shows annual amounts of water in acre-feet at the EHL heading, sum of all deliveries, and the resultant total loss for each year from 1964 through 1985. Data has not been finalized for 1986.

### 3.7 LATERAL FLUCTUATION STUDY

The Lateral Fluctuation Study is described in the Plan on page VI.22. For this study, the United States Department of Agriculture's Phoenix Water Conservation Laboratory (USDA) will be working with District staff. The first requirement of this program was to install continuous recorders on the lateral headings, checks, and deliveries. The goal of the program is to identify structural problems, and operational procedures which cause fluctuations in flow, resulting in variable deliveries to water users.

The amount of water delivered to a farm depends on the rate of flow and the length of time the water is allowed to run. The District delivers water in 24-hour units. The rate of flow is set at each delivery gate to match the total quantity of water desired. However, if the water level in a canal changes after a delivery gate has been set, the delivery flow rate will change. This can cause inaccurate deliveries.

Table 10  
IMPERIAL IRRIGATION DISTRICT  
WATER CONTROL SECTION

E.H.L. LOSS IN ACRE FEET

	TOTAL	DELIVERED	LOSS	LOSS DAILY AVERAGE	PER CENT OF LOSS
1964	1,131,931	1,081,572	50,359	138	4.45
1965	1,064,464	1,024,452	40,012	110	3.76
1966	1,169,745	1,115,604	54,141	148	4.63
1967	1,138,030	1,080,086	57,944	159	5.09
1968	1,186,972	1,117,534	69,438	190	5.85
1969	1,137,167	1,061,785	75,382	207	6.63
1970	1,143,193	1,082,351	60,842	167	5.32
1971	1,188,594	1,133,784	54,810	150	4.61
1972	1,167,407	1,106,077	61,330	168	5.25
1973	1,212,024	1,172,986	39,038	107	3.22
1974	1,208,242	1,241,138	39,104	107	3.05
1975	1,260,300	1,205,719	54,581	150	4.33
1976	1,176,609	1,109,179	67,430	184	5.73
1977	1,135,595	1,069,630	65,965	181	5.81
1978	1,119,367	1,067,295	52,072	143	4.65
1979	1,192,313	1,102,970	89,343	245	7.49
1980	1,164,482	1,113,243	51,239	140	4.40
1981	1,182,092	1,105,189	76,903	211	6.51
1982	1,081,853	992,914	88,939	244	8.22
1983	1,028,782	960,391	68,391	187	6.65
1984	1,117,364	1,032,151	85,213	233	7.63
1985	1,132,868	1,020,680	112,188	307	9.90

There are several possible causes for water-level fluctuations in a canal. Some possible causes include:

1. The release of water ponded behind an upstream check;
2. Opening or closing an upstream delivery gate;
3. Water backing up in a head ditch;
4. An increase or decrease in the level of a main supply canal; and
6. Having an irrigator move his water from one delivery to another.

Understanding how these fluctuations affect other deliveries is essential to increasing water delivery efficiency.

To get the most value from the program, recorders are being installed in all or most tailwater structures within the study area, and selected structures in the drains.

It should be noted that the contribution by the USDA, although important in the final analysis, has been minimal in the initial stage; that of installing recorders and collecting and recording the raw data.

Since the end of 1985, chart-type and electronic recorders have been installed at nearly all scheduled locations on the Myrtle and Munyon Laterals. Several broadcrested weirs have been installed at recorder locations where necessary; below certain lateral headings and farm head ditches.

### 3.8 STATE WATER CONSERVATION LOAN PROGRAMS

#### 3.8.1 The Clean Water Bond Law of 1984.

Several potential water conservation projects were submitted for consideration by DWR for loan programs. The Clean Water Bond Law provides for a funding mechanism to be implemented by DWR for loans to be made available to water agencies for use in conducting cost-effective, capital outlay, water conservation programs. The maximum loan for a single project is \$5 million, the interest rate will be 50 percent of average state general obligation bonds sold in the prior year (i.e., about 5 percent), and shall be repaid in 25 years or less.

The District submitted an application for a loan to the DWR on December 9, 1985, consisting of four projects as follows:

Project	Amount Requested	B/C Ratio
Trifolium Reservoir	\$1,600,000	3.80:1
Spill Interceptor	670,000	
Concrete Lining South Alamo Canal	680,000	3.48:1
Concrete Lining Program	2,050,000	2.27:1

At the ACWA Spring Conference the DWR announced on May 7, 1986, that the District was one of seven chosen for further review. It was also announced that the B/C ratio for those seven ranged from 13:1 to 3.5:1. This indicates that the first two pro-

jects listed above are eligible. By letter dated May 5, 1986, from David N. Kennedy, Director, DWR, the District was notified of its selection on a priority list of loan applicants. The letter advised that additional information would be required on the feasibility of the District's project, such as environmental documentation, water rights, plans and specifications, legal authorities, and ability to repay the loan.

### 3.8.2 Water Conservation and Water Quality Act of 1986

Assembly Bill No. 1982 passed the legislature and was signed by the Governor early in 1986. The legislation was subject to voter referendum which appeared on the June 3, 1986, primary ballot as Proposition No. 44. If passed by the voters, this legislation provided loan funds for two major purposes: (1) construction of Agricultural Drainage Water Management Facilities, and (2) voluntary, cost-effective capital outlay water conservation programs. The first program is being administered by the State Water Resources Control Board (SWRCB). By letter dated May 5, 1986, the District indicated to the SWRCB its interest in applying for a loan, for construction of combination storage and evaporation ponds for better management of agricultural drainage water, and also provide recreation and wildlife habitat areas.

The District staff will recommend that a separate application be filed with the DWR for a low-interest loan for water conser-

vation projects, under the 1986 Act, for the maximum amount of \$5 million to help fund eligible conservation programs for 1987 and 1988. At this time it appears that the applications will be for additional reservoirs, spill interceptors, or other capital outlay projects having favorable B/C ratios since the competition for the limited loans will be statewide.

### 3.9 INCENTIVES

Research on programs which would provide incentives for on-farm water conservation was also initiated in 1986. The District's Water Conservation Advisory Board appointed a committee to develop a workable incentive program. This special committee prepared the "Incentive Committee Report to the Water Conservation Advisory Board." A full description of these can be found in the report. Of the 38 various water conservation measures that were reviewed or developed in committee, 21 measures and four variations to these measures were classified into incentives, and 13 others were general water conservation measures.

Tailwater-based incentives provide the specific incentives to increase efficiency and reduce losses, which is the primary goal of water conservation. A major disadvantage to most such programs is the cost of measuring tailwater to verify that goals are attained.

There are two most promising types of tailwater-based programs. One pays a farmer for reducing tailwater within predetermined para-

meters and allows him to employ whatever means he chooses to save as much water as is economically feasible. The other program pays a farmer for effectively operating a pumpback system to predetermined specifications. A trial pumpback program is already in progress.

Programs which provide a service to farmers and which would make it practical for them to conserve water without additional expenses would also result in additional conservation. Services which are worthy of additional consideration include an irrigator training program. Another program would include improved training of zanjeros and other appropriate water personnel. It would also include a program by which water clerks could assist farmers to determine the amount of water needed for each irrigation, possibly in conjunction with a limited irrigation scheduling program.

With these types of incentives and water conservation approaches in mind, the following recommendations are made:

1) Irrigation Training

This incentive measure is a combination of training programs for irrigators and briefing sessions for farmers. Farmers and their irrigators will be taught improved scheduling and irrigation techniques.

2) Reduced Irrigation Water Rate/Tailwater Charge

This incentive measure involves the reduction of irrigation water cost to one half of the regular rate (\$4.50/AF), but a charge of triple the price of water for tailwater entering through the drainbox (\$27.00/AF). This would be a trial program limited to 5,000 acres. Cooperators would be in the program for a minimum of one year or one crop season.

3) Pumpback Standby Charges

It is recommended that electrical standby charges for farmers installing their own pumpback systems or already having their own pumpback systems be eliminated.

4) Twelve-Hour Runs for Stand Establishment

Seed germination through stand establishment. The charge for the 12-hour runs will be 1-1/2 times the regular cost per acre foot of water.

5) Recommended Changes in the 21-Point Program

Recommended changes in the 21-Point Water conservation Program, Points 13 and 14, involve the delaying of the notification time to the District for adjustments in the last 12 hours of the run to 4:30 p.m.

6) Zanjero Training on Water Delivery and Measuring Procedures

The training program now being developed by the District Water Department is supported by the advisory board. The advisory board also recommends its expansion as a means to aid in improving water delivery accuracy.

7) Recommendations on Unauthorized Gate Adjustments

Unauthorized gate adjustments cause fluctuations in delivery and canal spill. When a violation of this rule is discovered it should be rigorously enforced.

Recommended incentives for future trials and study as water transfer funds become available were also outlined:

1) Land Leveling

IID partial payments for land leveling.

2) Water Transfer Money

The allocation of a percentage of the water transfer money to landowners and/or water users for on-farm water conservation measures.

3) IID Personnel for High Tailwater Farmers

Appoint special IID water conservation personnel to work with high tailwater farmers.

- 4) Farmer/IID farm pond/laterals soils trade
- 5) One-time payment to landowner for on-farm water conservation measures
- 6) Awards for exceptional water conservation
- 7) Least fall irrigation

Additional measures were studied but not recommended:

- 1) Inverted rate structure
- 2) Reduced water rates for efficiency
- 3) Staged rebates for water conservation
- 4) Water rates based upon location
- 5) District would award credit or payments for no triple charge
- 6) IID would not require farmers to supply soil used in the lining of laterals.
- 7) Combined delivery modification - crop based rebates - tailwater payment/charge plan.
- 8) On-farm tailwater use for roadways and other needs
- 9) Farmer receives the first 4 acre-feet free but pays \$20.00 per acre foot for tailwater going out of the tailwater box (a field trial).

## SECTION 4

### 4. PROGRAM ACCOMPLISHMENTS

#### 4.1 OVERVIEW

This section will describe the water conservation programs proposed and accomplished for calendar year 1986.

Only a few structural projects were completed during the year since the activities centered on planning. Administrative programs were developed, Parsons' reports were analyzed and overall program goals were defined.

#### 4.2 TAILWATER MONITORING

The Tailwater Program has been continued to date under the same 13- and 21-Point Program rules as before. The percentage of incoming water below Drop No. 1 going to the Salton Sea has gradually declined during this period, a measure of the impact of tailwater monitoring and other conservation efforts. Natural flows are included in the inflow. Discharge to the Salton Sea as a percentage of flow received at Drop No. 1 were as follows:

1984 - 34%

1985 - 32%

1986 - 32%

Exhibit 6 is a summary of tailwater monitoring activities for calendar year 1986, showing deliveries ("Heads") and tailwater moni-

IMPERIAL IRRIGATION DISTRICT  
WATER CONTROL SECTION  
TAILWATER MONITORING SUMMARY  
1986

HEADS WITH OVER 15% TAILWATER DISCHARGE

MONTH	HEADS RUNNING			FIRST CHECK		ASSESSED	
	TOTAL	CHECKED	%	HEADS	%	HEADS	%
JAN.	8439	7839	92.9%	312	4.0%	103	1.3%
FEB.	7851	6933	88.3%	224	3.2%	65	0.9%
MAR.	13935	12698	91.1%	314	2.5%	84	0.7%
APR.	16288	14852	91.2%	352	2.4%	67	0.5%
MAY	15088	13743	91.1%	194	1.4%	32	0.2%
JUN.	12707	11747	92.4%	147	1.3%	12	0.1%
JUL.	12735	11816	92.8%	121	1.0%	20	0.2%
AUG.	12625	11667	92.4%	176	1.5%	46	0.4%
SEP.	13661	12499	91.5%	252	2.0%	106	0.8%
OCT.	11086	9925	89.5%	190	1.9%	66	0.7%
NOV.	8602	7947	92.4%	117	1.5%	41	0.5%
DEC.	6999	6420	91.7%	106	1.7%	22	0.3%
TOTAL	140016	128086	91.5%	2505	2.0%	664	0.5%

toring (Checks"). The heads checked have consistently been in the 88-93 percent range. The number of monthly assessments (triple or multiple charge for excessive tailwater) ranges from 12 to 106, for all months during this period.

Table 11 is a record of monthly monetary assessments for excessive tailwater for 1985 and 1986. This program must be continued, but ways to improve it need to be sought. The Water Conservation Advisory Board has been asked to respond to this need, but the process is difficult and slow.

Table 12 is a summary of charges for unauthorized gate adjustments for 1985 and 1986.

#### 4.3 OPERATIONAL DISCHARGE

In the system wide operational discharge study, the random selection of representative laterals has been made and the discharge at the end of each is monitored. Water-level recorders were installed at the following sites in October and November, 1985, and 24-hour data is being collected.

Holt	Stanley Lateral 1
EHL Lateral 10	Oakley
EHL Lateral 14	Moorehead
Ash Lateral 6	Moss
Ash Lateral 45	Malva 1
Pomelo	Marigold
Oasis	Sumac Lateral 1
Wistaria Lateral 6A	Spruce Lateral 3

TABLE 11

WATER ASSESSMENT

Year	Month	Amount Assessed	Year	Amount Assessed
1985	January	\$ 28,053.64	1986	\$ 26,793.00
	February	35,469.00		720.80
	March	39,227.80		24,930.00
	April	36,307.80		17,704.80
	May	21,308.40		11,793.60
	June	10,141.20		3,808.80
	July	5,382.00		5,731.20
	August	17,254.80		13,257.00
	September	14,722.20		28,581.60
	October	18,599.40		19,516.20
	November	17,395.20		13,042.20
	December	5,531.40		9,406.80

TABLE 12

GATE CHARGES

Year	Month	Charge	Year	Charge
1985	January	\$ 1,100.00	1986	\$ 800.00
	February	600.00		700.00
	March	500.00		100.00
	April	300.00		-0-
	May	300.00		400.00
	June	300.00		100.00
	July	500.00		200.00
	August	300.00		600.00
	September	500.00		800.00
	October	400.00		800.00
	November	200.00		2,000.00
	December	100.00		800.00

Wormwood  
 Dogwood Lateral 10  
 Daffodil  
 Redwood  
 Elder  
 Elder Lateral 13  
 Eucalyptus Lateral 10

Trifolium Lateral 5  
 Trifolium Lateral 9  
 Trifolium Extension Lat. 9  
 Lateral "E"  
 Lateral "S"  
 Niland Lateral 2  
 Vail Lateral 4

The recorder sheets are reduced by Water Control personnel and a report of the results given to the Water Engineering Section for analysis.

Data for 1986 has been analyzed preliminarily and is summarized below:

#### Lateral Spills

Number of sites recorded	29
Number of record days	9,587 days
Average spill per lateral per day	0.5447 cfs <sup>1/</sup> /day/lateral
Number of lateral spill sites	240
Total yearly spill	84,972 AF

#### Main Canals (direct measurement)

East Highline Canal	3,854 AF
Westside Main Canal	3,712 AF
Central Main Canal	-0-
Rositas Canal	165 AF
Vail Supply Canal	1,978 AF
Elder Canal	<u>1,429</u> AF
	11,138 AF

System Wide Spill 96,110 AF

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<sup>1/</sup> One cfs-day is equivalent to a flow of one cfs for 24 hours.

#### 4.4 TILE DRAIN DISCHARGE

Re-evaluation of the District's Tile Drain Discharge Report resulted in the development of a field study to determine the original program's accuracy. The original sample sites were selected years ago for operation and maintenance purposes. They are located generally in the north central portion of the District's low lying areas. For the evaluation, ten fields were selected from the east portion of the District. Field data was still being compiled during 1986. After a representative number of samples is obtained a comparative analysis will be conducted between the original program and the test area study.

#### 4.5 CANAL LINING

The District continued its concrete lining program by adding 6.83 miles during 1986. Concrete lining is a proven water conservation program. Seepage reduction is the primary goal, but other benefits have become apparent based on over 30 years of experience, including the following:

1. Reduce or eliminate Hydrilla and other aquatic and nonaquatic weeds from canals and adjacent rights-of-way.
2. Reduce or eliminate weed seeds from canal bank from falling into water and spreading to water users' fields.
3. Reduce exposed surface area to lessen evaporation loss.

The following is a summary of the work done in 1986.

Canal	Length (Miles)	Water Conserved (AF/Year)
Wistaria Canal	1.43	221
Trifolium Extension	1.34	170
Dandelion	1.11	121
Rockwood Lateral 8	0.5	50
Rockwood	1.86	307
Dogwood Lateral 2	0.4 (pipeline)	50
Birch P-2 Canal	0.19 (pipeline)	9

Average annual unit water savings is thus 136 AF/mile.

Table 13 provides a historical overview of the Districts' Canal Lining Program. Please note that this tabulation excludes pipelining.

A methodology has been developed to estimate water savings due to concrete lining. Canal seepage and surface evaporation are calculated for each section of canal before and after lining. Soil permeabilities are estimated from drainage investigation well logs. A permeability of 0.07 foot per day is assumed for concrete sections. Surface evaporation is estimated using an average pan evaporation rate of 8.5 feet per year and a pan coefficient of 0.69. The necessary earth and concrete cross-section measurements are taken from plan and profile drawings and entered into a computer worksheet which automatically calculates water savings.

The total water savings from the 1985 concrete lining program has been estimated to be 4,000 AF per year. Cumulative annual water savings resulting from the concrete lining program through 1985 are estimated by the task group to be about 60,000 acre-feet per year.

TABLE 13

## SUMMARY OF CONCRETE LINED CANALS

Year	Concrete Lined Farm Ditches		Concrete Lining of District Canals For Private Maintenance		For District Maintenance		Totals	
	Length (Miles)	Cumulative Length (Miles)	Length (Miles)	Cumulative Length (Miles)	Length (Miles)	Cumulative Length (Miles)	Annual	Cumulative
1955	103.00	298.90	1.15	1.15	.50	1.30	104.65	301.35
1956	125.60	424.50	4.05	5.20	1.66	2.96	131.31	432.66
1957	128.90	553.40	4.53	9.73	3.15	6.11	136.58	569.24
1958	98.40	651.80	4.97	14.70	3.11	9.22	106.48	675.72
1959	115.70	767.50	7.56	22.26	4.07	13.29	127.33	803.05
1960	122.10	889.60	4.60	26.86	3.62	16.91	130.32	933.37
1961	89.50	979.10	4.41	31.27	10.10	27.01	104.01	1,077.38
1962	93.30	1,072.40	1.60	32.87	17.67	44.68	112.57	1,149.95
1963	118.30	1,190.70	5.74	38.61	27.54	72.22	151.58	1,301.53
1964	110.80	1,301.50	3.53	42.14	50.52	122.74	164.85	1,466.38
1965	80.70	1,382.20	.76	42.90	54.35	177.09	135.81	1,602.19
1966	72.30	1,454.50	.75	43.65	68.24	245.33	141.29	1,743.48
1967	62.90	1,517.40	.40	44.05	60.24	305.57	123.54	1,867.02
1968	67.50	1,584.90	1.02	45.07	51.68	357.25	120.20	1,987.22
1969	73.00	1,657.90	.27	45.34	56.11	413.36	129.38	2,116.60
1970	66.10	1,724.00	.61*	45.95*	38.74*	452.10*	105.45*	2,222.05*
1971	63.10**	1,787.10**	.93	46.88	35.85	487.95	99.88**	2,321.93**
1972	61.20	1,848.30	1.21	48.09	36.20	524.15	98.61	2,420.54
1973	71.50	1,919.80	1.11	49.20	29.94	554.09	102.55	2,523.09
1974	94.50	2,014.39	1.00	50.20	31.17	585.26	126.67	2,649.76
1975	56.80	2,071.10	2.44	52.64	38.39	623.65	97.63	2,747.39
1976	68.00	2,139.10	.77	53.41	38.25	661.90	107.02	2,854.41
1977	60.30	2,199.40	.30	53.71	34.63	696.53	95.23	2,949.64
1978	33.40	2,232.80	-	53.71	19.20	715.73	52.60	3,002.24
1979	25.50***	2,258.30***	-	53.71	21.79	737.52	47.29***	3,049.53***
1980	37.40***	2,295.70***	-	53.71	21.36	758.88	58.76***	3,108.29***
1981	43.60***	2,339.30***	-	53.71	27.30	786.18	70.90***	3,179.19***
1982	36.20	2,375.50	-	53.71	18.52	804.70	54.72	3,233.91
1983	24.10	2,399.60	-	53.71	23.08	827.78	47.18	3,281.09
1984	21.40	2,421.00	-	53.71	43.49	870.27	43.48	3,344.98
1985	24.80	2,445.80	-	53.71	30.52	900.79	55.32	3,400.30
1986	10.40	2,456.20	-	53.71	6.23	907.02	16.63	3,416.93

\* Correction 3/22/72

\*\* Correction 1/73

\*\*\* Correction 2/17/83

Mileage on District canals shown includes structures

Table 14 gives annual costs for concrete lining from 1954 through 1986.

#### 4.6 SEEPAGE RECOVERY

Operation and maintenance of the 12 seepage recovery systems along the East Highline Canal continued through 1986, with 15,072 acre-feet of seepage being recovered and returned to the canal. Costs shown are for electric power only, as calculated in the Water Department engineering and vary slightly from cost reports.

Table 15 provides a breakdown of annual power costs. Based on this data, average unit costs in 1986 were \$2.08/AF. During their 1985 studies, Parsons estimated that seepage recovery pumps along the All-American Canal between Drop 3 and Allison Check annually recover about 8,000 AF (EIR, Table 2.2, page 2-9), which is in addition to the East Highline recovery pumps.

#### 4.7 REGULATING RESERVOIRS

The District continued to operate and maintain the four existing regulating reservoirs. Reservoirs are operated alternately on a basis of inflow and outflow on a daily basis. The monthly quantities diverted into (column Heading "to") and released from (Column Heading "from") each reservoir during 1985 and 1986 are shown in Table 16 and 17. The total water diverted into the four reservoirs for 1985 was 110,301 AF, and 110,894 AF for 1986. The Task Group believes that a conservative estimate of annual water savings is in the range of 15,000 to 25,000 AF/year.

TABLE 14  
IMPERIAL IRRIGATION DISTRICT  
CONCRETE LINING  
1954-1986

<u>Year</u>	<u>Length</u>	<u>IID Costs</u>	<u>Landowner Costs</u>	<u>Total</u>
1954	.80	\$ 5,189	\$ -	\$ 5,189
1955	1.65	4,231	2,490	6,721
1956	5.71	23,892	11,591	35,483
1957	7.68	19,793	4,252	24,045
1958	8.08	24,839	6,169	31,008
1959	11.63	41,934	20,628	62,562
1960	8.22	28,355	16,780	45,135
1961	14.51	68,715	37,819	106,534
1962	19.27	153,452	93,663	247,115
1963	33.28	304,903	123,678	428,581
1964	54.05	755,877	162,639	918,516
1965	55.11	639,895	106,100	745,995
1966	68.99	999,598	228,415	1,228,013
1967	60.64	1,032,525	192,839	1,225,364
1968	52.70	887,255	182,643	1,069,898
1969	56.38	1,034,195	219,608	1,253,803
1970	39.35	753,061	129,885	882,946
1971	36.68	743,133	165,756	908,889
1972	37.41	890,306	193,966	1,084,272
1973	31.05	761,873	165,877	927,750
1974	32.17	926,410	206,840	1,133,250
1975	40.83	1,509,594	298,273	1,807,867
1976	39.02	1,641,464	309,045	1,950,509
1977	34.93	1,448,962	276,319	1,725,281
1978	19.20	902,106	171,569	1,073,675
1979	21.79	1,112,430	188,718	1,301,148
1980	21.36	1,325,038	239,964	1,565,002
1981	27.30	2,004,615	387,783	2,392,398
1982	18.52	1,915,304	256,388	2,171,692
1983	23.08	1,808,892	198,330	2,007,222
1984	43.49	3,105,290	26,968*	3,132,258
1985	30.52	3,431,773	-	3,431,773
1986	6.23	749,612	-	749,612
		\$31,054,511	\$4,624,995	\$35,679,506

\*This amount was actually deposited by landowners before the resolution was passed by the Board of Directors that allowed the IID to take over all concrete lining costs. The amount was later refunded to the landowners.

TABLE 15

## WATER RECOVERY DRAINS PARALLEL TO EAST HIGHLINE CANAL

Year	DP-17		DP-18		DP-19		DP-20		DP-21		DP-22		DP-23	
	Plum to Pine Acre-Feet Recovered	Cost	Pear to EHL Lat. 10 Acre-Feet Recovered	Cost	EHL Lat. 10 to Lat. 11 Acre-Feet Recovered	Cost	Oat to Oasis Acre-Feet Recovered	Cost	Highway 80 to EHL Lat. 8 Acre-Feet Recovered	Cost	EHL Lat. 8 to Pear Acre-Feet Recovered	Cost	Oak to Moss Acre-Feet Recovered	Cost
1970	1,321	479	1,416	533	658	332	653	314	1,088	447	621	328	925	361
1971	1,349	487	1,455	544	570	304	640	309	1,053	436	593	317	1,351	533
1972	1,207	451	1,388	526	568	306	599	295	1,123	456	652	332	1,297	519
1973	1,130	432	1,410	531	511	284	589	287	936	431	658	334	1,272	513
1974	1,109	590	1,363	680	599	384	587	304	889	532	588	385	1,340	700
1975	1,072	790	1,220	889	512	448	301	263	932	606	499	437	1,190	927
1976	984	755	1,084	839	470	422	371	314	865	717	507	461	1,269	948
1977	1,060	928	663	643	397	428	397	384	885	878	347	371	1,347	1,119
1978	977	977	559	679	390	462	441	439	911	915	242	438	1,347	1,272
1979	1,113	1,252	693	992	260	406	515	528	921	1,104	243	524	1,298	1,510
1980	922	1,245	676	992	194	339	475	630	778	1,102	281	580	1,313	1,796
1981	948	1,335	788	1,195	390	367	309	780	866	1,350	643	822	1,334	1,774
1982	1,089	1,913	811	1,648	377	435	258	1,125	860	1,796	482	997	1,240	2,198
1983	1,154	2,221	938	2,157	355	598	206	1,204	860	2,066	494	1,351	1,150	2,482
1984	1,066	2,206	842	2,087	288	591	249	1,224	902	2,036	456	1,268	1,215	2,535
1985	905	1,562	875	1,793	300	761	338	975	722	1,403	459	1,040	1,105	1,917
1986	889	1,829	833	1,878	512	827	339	1,111	701	1,536	476	1,266	1,095	2,153

Year	DP-24		DP-25		DP-26		DP-27		DP-28		Totals		Average Power	
	Ohmar to Oleander Acre-Feet Recovered	Cost	Orange to Ohmar Acre-Feet Recovered	Cost	Oxalis to Orange Acre-Feet Recovered	Cost	EHL Lat. 11 to Lat. 12 Acre-Feet Recovered	Cost	Oasis to Orient Acre-Feet Recovered	Cost	Acre-Feet Recovered	Cost	Cost Per Acre-Foot	
1970	406	143	-	-	-	-	-	-	-	-	6,682	2,794	0.42	
1971	1,854	653	1,361	627	-	-	-	-	-	-	7,417	3,073	0.41	
1972	1,795	636	1,489	648	-	-	-	-	-	-	10,049	4,165	0.39	
1973	1,388	1,168	1,370	1,195	3,126	1,120	2,731	1,012	-	-	15,830	6,228	0.76	
1976	1,760	1,388	1,210	1,388	3,047	2,387	3,062	2,271	-	-	17,792	13,569	0.88	
1977	1,833	1,569	1,322	1,544	3,704	2,665	2,947	2,566	3,244	2,412	17,304	15,170	0.96	
1978	1,639	1,827	1,146	1,780	3,332	3,475	3,039	2,863	3,255	2,633	17,971	17,266	1.16	
1979	1,625	2,138	1,113	2,061	3,357	3,777	3,014	2,469	3,449	3,383	17,623	20,401	1.35	
1980	1,456	1,915	1,249	2,139	3,235	4,469	2,883	3,836	3,499	3,983	17,116	23,171	1.37	
1981	1,523	2,346	1,188	2,741	3,460	4,339	3,021	4,040	3,321	3,923	17,560	23,979	1.80	
1982	1,478	2,666	1,287	2,741	3,137	5,966	2,947	5,213	3,148	4,956	17,383	31,334	2.12	
1983	1,440	2,666	1,287	3,137	3,280	6,788	2,794	5,691	3,052	5,928	17,142	36,289	2.06	
1984	1,604	2,690	1,440	3,092	3,280	5,539	2,669	5,539	2,669	5,807	16,807	34,614	1.77	
1985	1,604	2,237	1,008	2,480	1,870	3,219	2,544	4,087	2,991	4,565	14,721	26,039	1.77	
1986	1,586	2,937	1,081	2,919	1,977	5,324	2,692	4,703	2,891	4,857	15,072	31,340	2.08	

Mileage: .50 Mile - Total 6.00 Miles  
Power costs calculated in Engineering Section

IMPERIAL IRRIGATION DISTRICT  
WATER CONTROL SECTION

RESERVOIRS IN ACRE FEET FOR 1903

	SINGH			FUDGE			SHELDON			SPERBER		
	TO	FROM	NET	TO	FROM	NET	TO	FROM	NET	TO	FROM	NET
JANUARY	1,691	1,790	(99)	1,783	1,863	(80)	1,826	1,854	(28)	1,283	1,412	(129)
FEBRUARY	2,005	2,110	(105)	1,744	1,600	56	2,346	2,343	3	1,570	1,698	(128)
MARCH	2,922	2,731	191	2,116	2,164	(48)	4,053	4,145	(92)	2,600	2,464	136
APRIL	3,199	3,122	77	2,130	2,000	42	2,547	2,346	201	2,595	2,655	(60)
MAY	3,165	3,297	(132)	2,175	2,054	121	2,343	2,305	38	2,685	2,534	151
JUNE	2,954	2,971	(17)	2,113	2,132	(19)	2,129	2,018	111	3,387	3,352	35
JULY	3,906	3,777	129	2,056	2,057	(1)	2,152	2,092	60	3,515	3,512	3
AUGUST	2,504	2,584	(80)	2,063	2,040	23	2,205	2,160	45	3,255	3,004	171
SEPTEMBER	2,293	2,190	103	2,094	1,988	106	1,939	2,010	(71)	2,785	2,809	(24)
OCTOBER	2,420	2,351	69	1,951	1,995	(44)	2,014	2,022	(8)	2,173	2,132	41
NOVEMBER	1,956	1,889	67	1,863	1,758	105	2,061	1,921	140	1,920	1,812	108
DECEMBER	1,262	1,375	(113)	1,873	1,906	(133)	1,869	1,969	(100)	805	798	7
TOTAL	30,277	30,187	90	23,961	23,823	138	27,484	27,185	299	28,579	28,262	317
AVERAGE DAILY C F S	41.8	41.7	0.1	33.1	32.9	0.2	38.0	37.5	0.4	39.5	39.0	0.4

IMPERIAL IRRIGATION DISTRICT  
WATER CONTROL SECTION

RESERVOIRS IN ACRE FEET FOR 1986

	SINGH			FUDGE			SHELDON			SPERBER		
	TO	FROM	NET	TO	FROM	NET	TO	FROM	NET	TO	FROM	NET
JANUARY	2,657	2,592	65	1,971	1,924	47	1,998	1,969	29	1,400	1,397	3
FEBRUARY	2,425	2,417	8	1,927	1,896	31	2,103	1,979	124	1,612	1,628	(16)
MARCH	2,801	2,816	(15)	2,336	2,323	13	2,099	2,073	26	3,075	3,070	5
APRIL	2,959	2,982	(23)	2,419	2,444	(25)	1,989	2,065	(76)	3,096	3,161	(65)
MAY	2,628	2,627	1	2,029	2,029	0	2,129	2,067	62	3,947	3,839	108
JUNE	3,056	3,025	31	2,172	2,115	57	2,029	2,002	27	2,861	2,799	62
JULY	2,820	2,815	5	2,261	2,175	86	2,071	2,015	56	2,694	2,566	128
AUGUST	2,523	2,332	191	2,406	2,400	6	2,236	2,141	95	2,818	2,888	(70)
SEPTEMBER	2,462	2,525	(63)	2,307	2,264	43	2,162	2,033	129	2,378	2,188	190
OCTOBER	2,773	2,749	24	2,208	2,231	(23)	2,068	2,202	(134)	1,499	1,510	(11)
NOVEMBER	2,548	2,543	5	2,144	2,044	100	2,019	1,893	126	1,467	1,439	28
DECEMBER	2,015	2,096	(81)	1,985	2,150	(165)	1,845	1,849	(4)	1,467	1,460	7
TOTAL	31,667	31,519	148	26,165	25,995	170	24,748	24,288	460	28,314	27,945	369
AVERAGE DAILY C.F.S.	43.7	43.5	0.2	36.1	35.9	0.2	34.2	33.5	0.6	39.1	38.6	0.5

Preliminary analysis of the Sheldon, Sperber and Fudge reservoirs shows the dramatic decline in operational discharge within the systems served by each facility. Refer to Exhibit 7.

Other reservoirs are in the planning stage. Trifolium Extension Reservoir is under final consideration for funding under the Clean Water Bond Law of 1984. It is estimated that 4,600 AF/year of spill will be conserved once the reservoir is operational. Four projects have been submitted for evaluation under the Water Conservation and Water Quality Bond Law of 1986 being administered by DWR. One of these is a planned reservoir, the "Z" Lateral Heading Reservoir, expected to conserve 3,850 AF/year of spill per year.

#### 4.8 REMOTE CONTROL

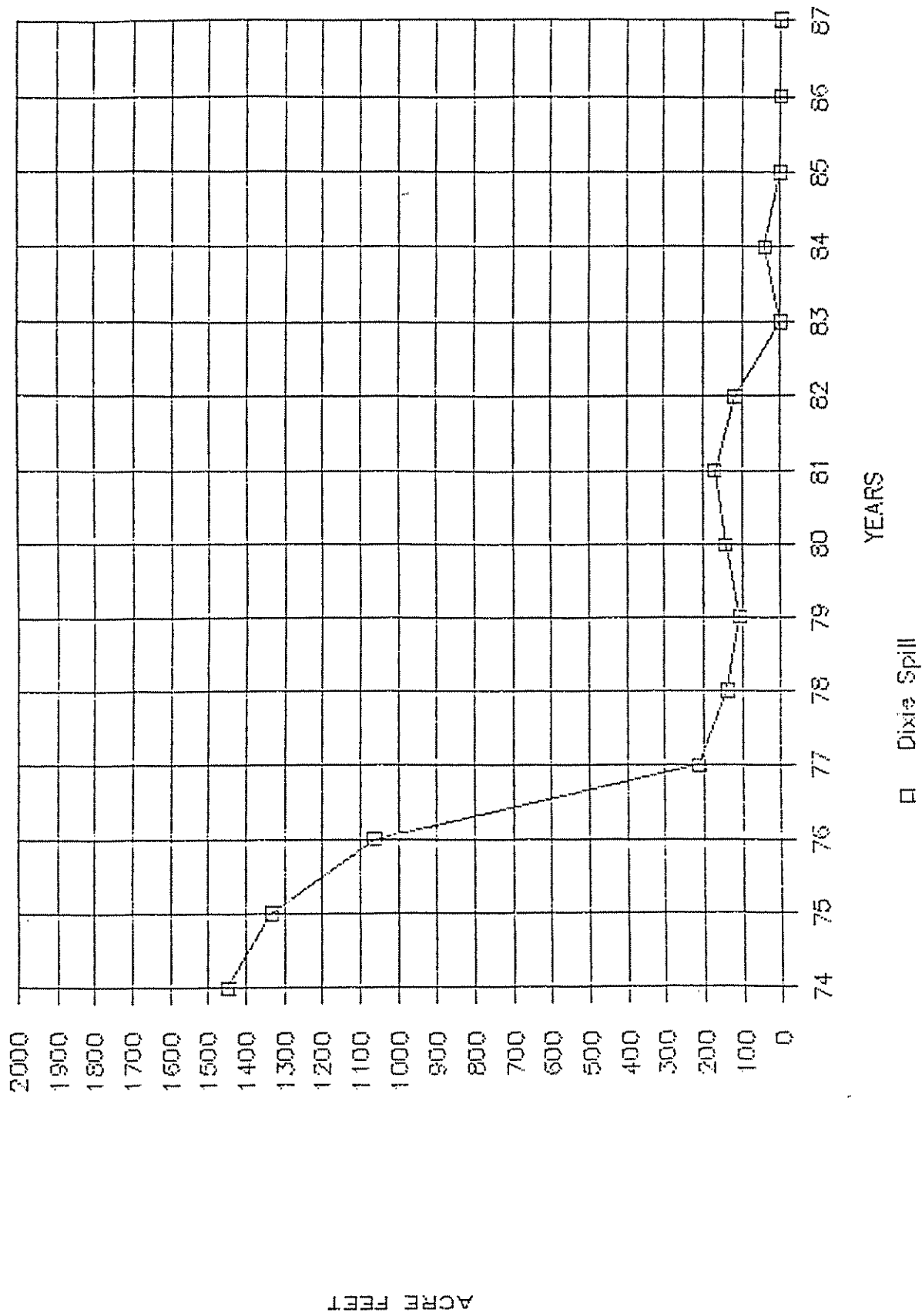
Additional remote controlled sites have not been constructed by the IID. As part of the overall water conservation planning, the system is being studied to determine a list of priority sites.

#### 4.9 IRRIGATION SCHEDULING PROGRAM

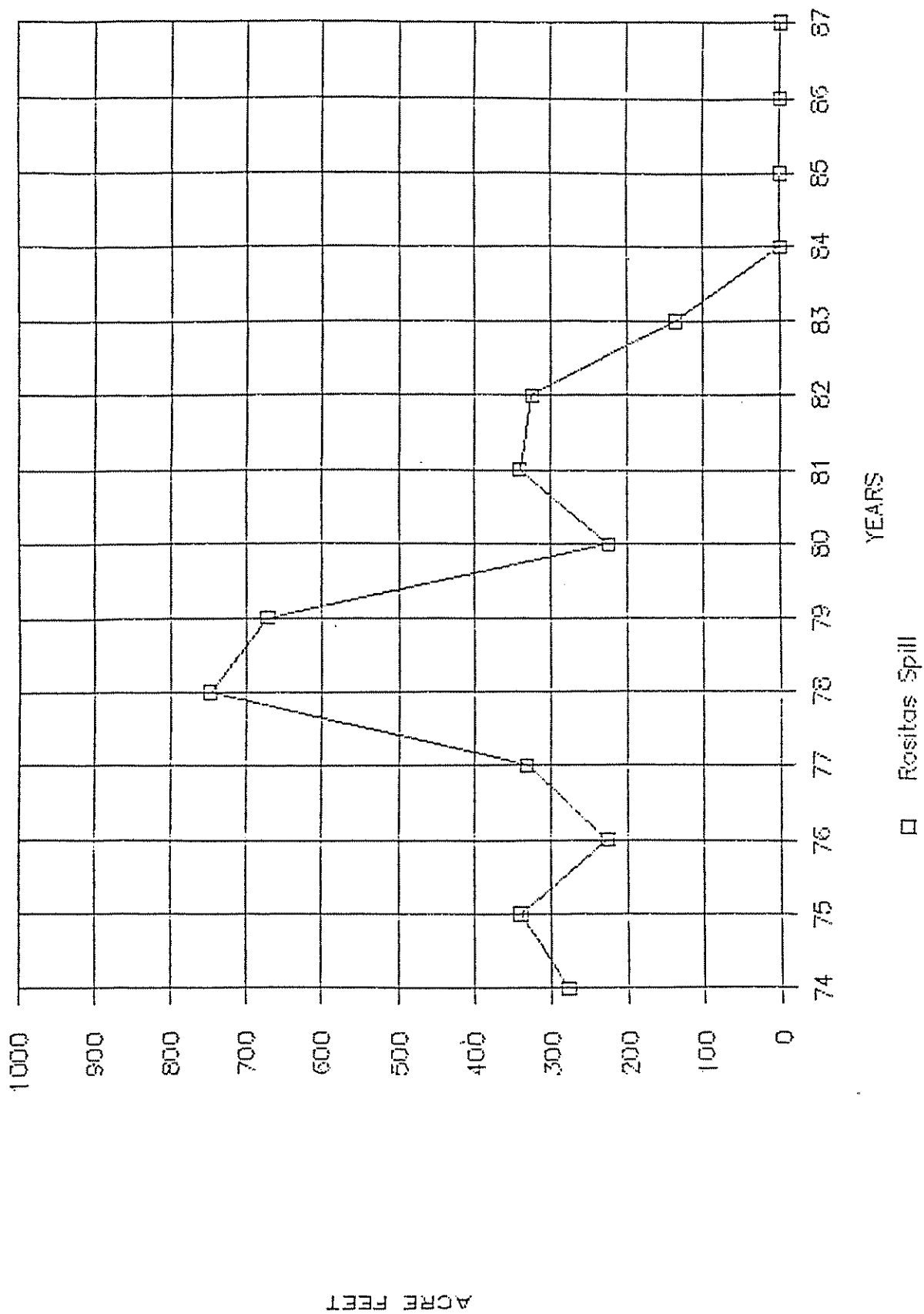
The Irrigation Scheduling Program was increased to 15,000 acres in 1985, after termination of the three-year cooperative agreement with the U.S. Bureau of Reclamation (USBR).

Many of the growers that had been in the program since its start were dropped from the program and new "high tailwater" growers were added. The tailwater assessment records were reviewed, and

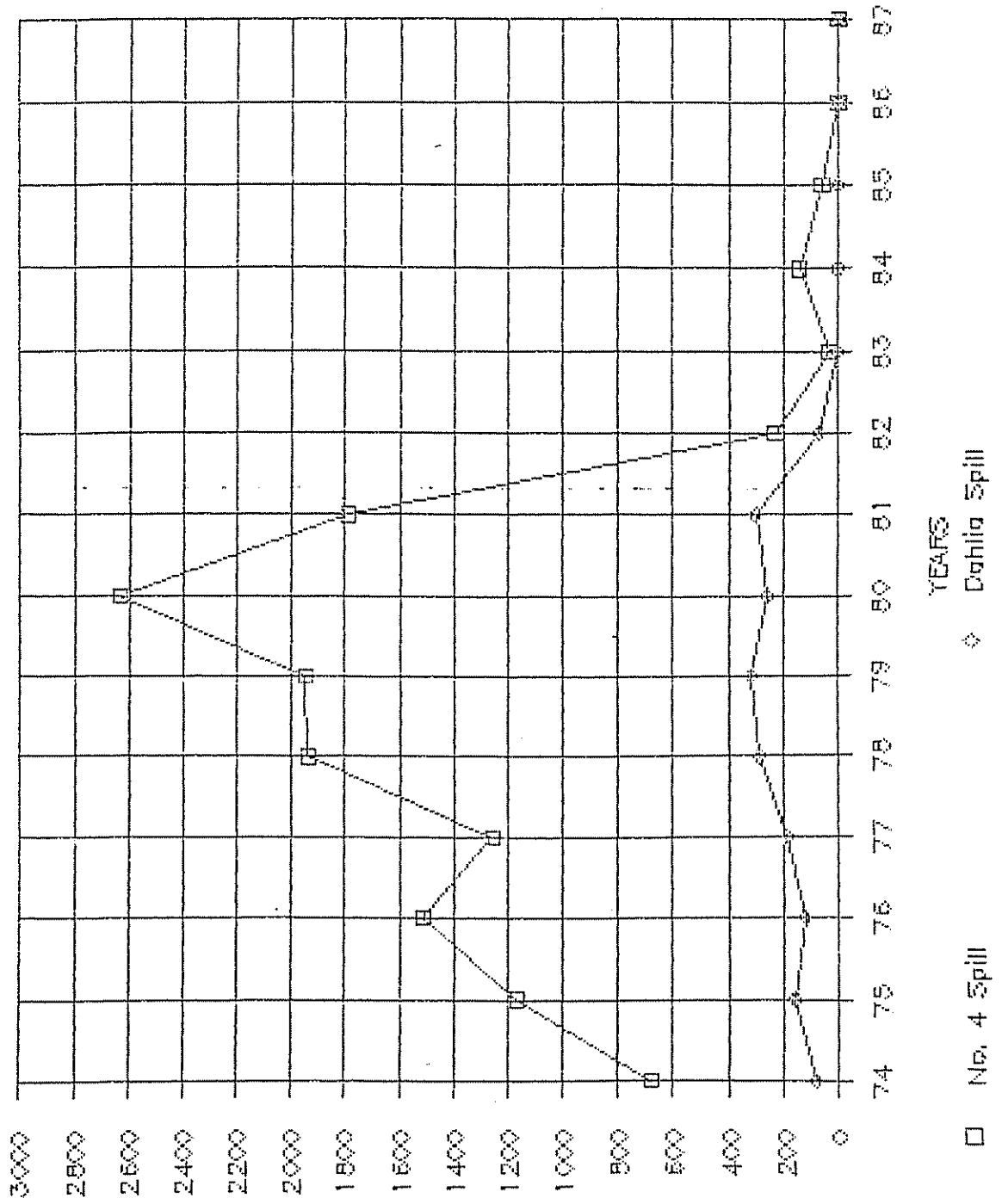
# SHELDON RESERVOIR



# SPERBER RESERVOIR



# FUDGE RESERVOIR



growers with three or more tailwater assessments on an individual field were contacted as potential cooperators in the programs.

Irrigation scheduling with the neutron probe has proven to be a simple but accurate method for monitoring soil moisture and scheduling irrigations. A majority of the farmers participating in the program have reduced their tailwater. On wheat fields where previously 10 to 12 irrigations were being applied in a season, 5 to 7 irrigations are now being applied.

On the average, two irrigations can be eliminated on wheat fields, which is a \$2.80 per acre labor savings. Approximately 0.13 AF less water will be applied to the field, resulting in a savings of \$1.13 per acre. The total savings would be \$3.93 per acre. The estimated cost for the scheduling service is \$5.00 per acre.

In 1985, tailwater on cotton and sugar beets was reduced by 26 percent and 16 percent respectively, on fields added to the program in 1984. Tailwater on the flat crops remained the same. Irrigation scheduling has a more immediate impact on tailwater flows from row crops due to the nature of the irrigation method.

Tailwater has been reduced yearly on Alfalfa Field Number 01-148, starting in 1982 from 25 percent; 1983, 19 percent., 1984, 12 percent; and in 1985, 10 percent. One grower that was added to

the program in 1984 has reduced tailwater on bermuda grass from 28 percent to 10 percent, a 73 percent reduction in tailwater.

Theoretically, irrigation scheduling in combination with proper irrigation application techniques could conserve up to 100,000 acre-feet of water per year. However, as the program to date has proven, complete acceptance by all of the water users, has not occurred.

Recently the Agricultural Research Service has developed the modified broadcrested weir to measure water in open channels or ditches. The new style weir eliminates most of the problems connected with other weirs and flumes. If properly constructed, the discharge rate can be mathematically determined using as-built dimensions within allowable tolerances. Very low head losses are required. The low cost modified broadcrested weir is easy to construct, usually taking only a few hours to install and costing less than one hundred dollars.

The broadcrested weir has been used extensively in the IID's Irrigation Scheduling Program to measure delivery. In conjunction with the weir, a water level recorder has been used to record the totalized discharge.

Although the broadcrested weir is an excellent tool for measuring delivery (+/- 2 percent accuracy), it is not practical for use in measuring all deliveries in the IID. This is because some head loss is required for proper measurements and in some cases the

head is not available. Research is ongoing to develop other applicable methods for measuring deliveries in very low head loss conditions.

#### 4.10 CIMIS

The California Irrigation Management Information System (CIMIS) program was implemented during 1986.

Existing staff was augmented by the addition of an Agricultural Engineer whose responsibilities during 1986 included:

- 1) Enlist growers for the program;
- 2) Install equipment to measure and monitor water flows;
- 3) Implement computer software and adapt it for local use;
- 4) Prepare Irrigation and Salinity Handbook for the Imperial Valley.
- 5) Report progress.

CIMIS information will be used in the irrigation scheduling program. This will allow growers to schedule irrigations using accurate information.

#### 4.11 HYDRILLA CONTROL RESEARCH PROGRAM

The Hydrilla Control Research Program (HCRP) is a multiagency cooperative effort under direction of the Hydrilla Technical Advisory Committee (HTAC).

HCRP was established to:

- 1) Identify and evaluate eradication methods
- 2) Coordinate research efforts in Imperial Valley
- 3) Design, develop and implement eradication technology

Member agencies involved in HTAC are:

- 1) California Department of Fish and Game
- 2) U.S. Department of Agriculture - Agricultural Research service/  
APHIS PPQ
- 3) Coachella Valley Water District
- 4) California Department of Water Resources
- 5) County of Imperial Agricultural Commissioner
- 6) California Regional Water Quality Control Board

HCRP investigations have been directed towards evaluating mechanical, chemical and biological control methods. Integrated control methods are also under study. A management plan for implementation of promising eradication technology is the ultimate goal of the program. Mechanical and chemical control methods were evaluated from 1981 to 1985. Findings were presented in HCRP Annual Reports for the five-year period. No additional testing has been conducted for these two control methods.

Biological control methods have been identified by HTAC as being the most acceptable technically, economically and environmentally. Triploid Grass Carp, certified sterile, have been used under

intensive laboratory study and field testing. Extremely satisfying results have been experienced with the Triploid Grass Carp. Over 95 percent of the hydrilla that infested District waterways has been removed.

District staff have developed the expertise to produce large quantities of this fish for deployment in the field. A facility is presently under construction that will produce the necessary stock in adequate numbers and certifiable sterility.

#### 4.12 DEMONSTRATION TAILWATER RECOVERY PROGRAM

Demonstration Tailwater recovery systems - also designated "pumpbacks" - were installed on five fields during 1985 at the following locations;

Newside Lateral 3-A  
Central Main 15  
"Q" Lateral, 13/15  
Trifolium Lateral 8, 153  
Ash Lateral 61-E

The total capital, operation and maintenance costs of these systems are paid by the District from the Water Conservation Fund, except the energy charge component of the power bill, which the water user pays.

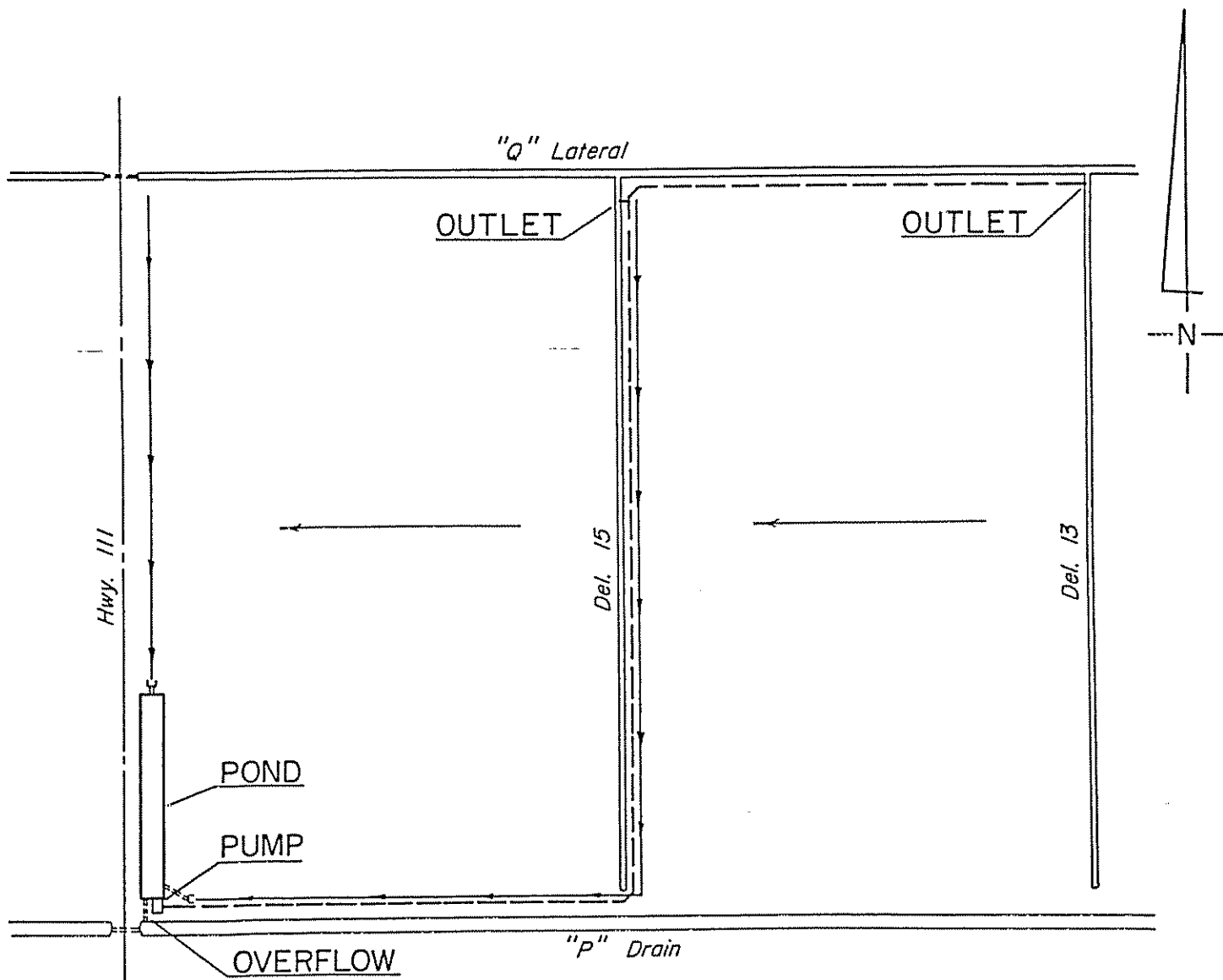
Table 18 is a cost summary of the five systems installed. The major physical data is given in Table 19. Exhibit 8 shows the schematic layout of the pumpback systems. The purpose of this

TABLE 18  
TAILWATER PUMPBACK SYSTEMS  
COST SUMMARY

SYSTEM OWNER	PUMP		PIPELINE		POND		TOTAL
	MATERIAL	LABOR	MATERIAL	LABOR	MATERIAL	LABOR	
VEYSEY	11,116	3,655	29,615	12,663	2,243	8,906	68,198
BENSON	9,858	2,303	49,115	16,276	2,786	1,858	79,950
SMITH	8,617	4,116	40,611	12,911	2,485	4,919	72,583
MALLORY	21,881	2,149	35,231	10,359	2,843	2,741	75,204
NILSON	16,679	1,318	39,635	7,642	2,786	2,938	70,998

TABLE 19  
TAILWATER PUMPBACK SYSTEMS  
SUMMARY

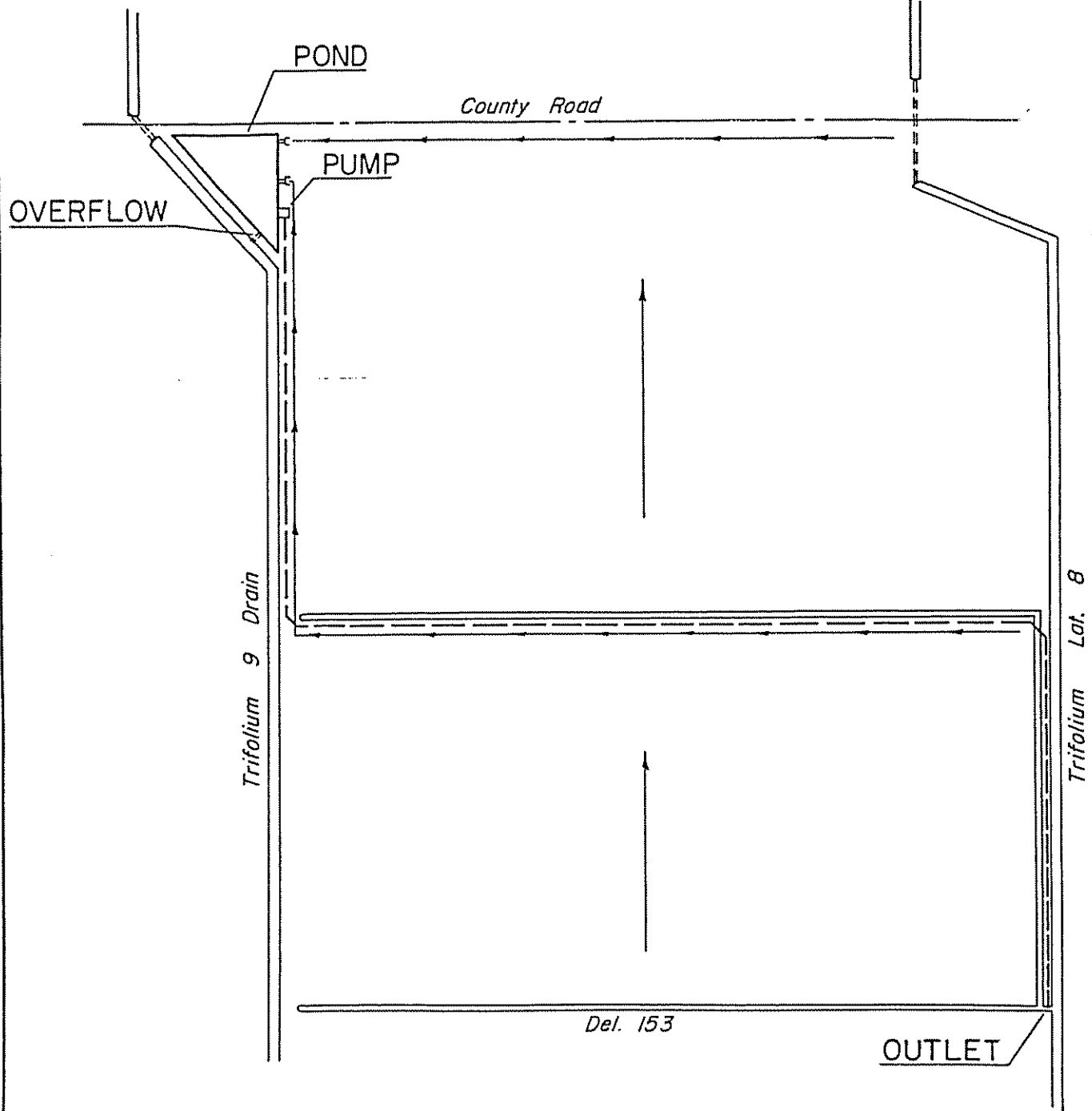
SYSTEM OWNER	COST (\$)	AREA SERVED (AC)	SERVICE LINE		PUMP		STORAGE VOLUME (AF)
			SIZE (PVC)	LENGTH (FT)	HP	CAPACITY (CFS)	
VEYSEY	68,198	320	12"	3,425	20	3	4.0
BENSON	79,950	440	12"	6,700	30	3	10.0
SMITH	72,583	175	12"	5,450	30	3	3.0
MALLORY	75,204	188	12"	5,200	20	3	3.7
NILSON	70,998	155	12"	5,100	20	3	2.8



Refer Dwg. 12F-6923

J. R. SMITH PUMPBACK

NE  $\frac{1}{4}$  SEC. 16 and W  $\frac{1}{2}$  W  $\frac{1}{2}$  NW  $\frac{1}{4}$  SEC. 15  
T. 11 S. - R. 14 E.

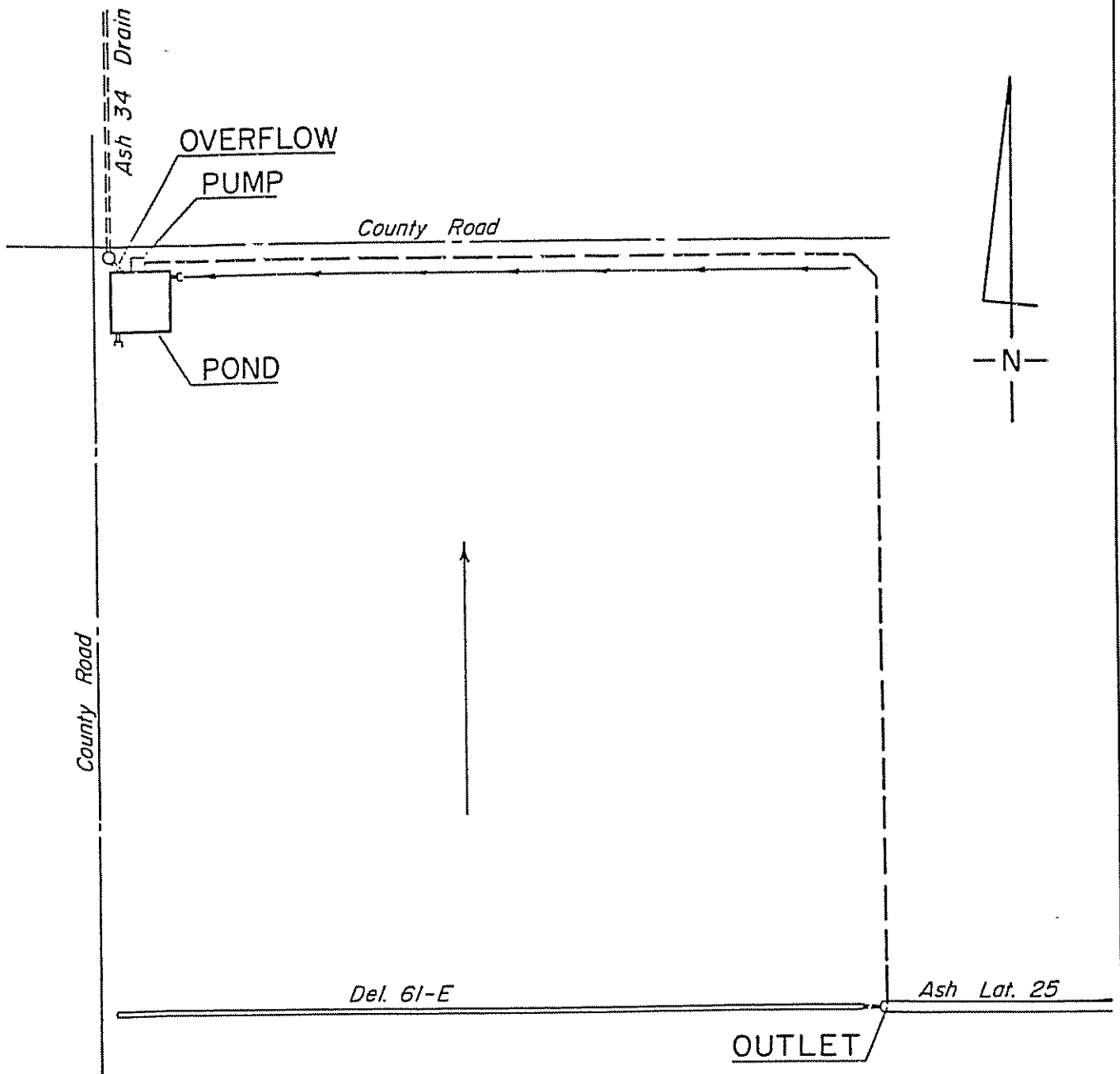


Refer Dwg. 12F-6924

MALLORY PUMPBACK

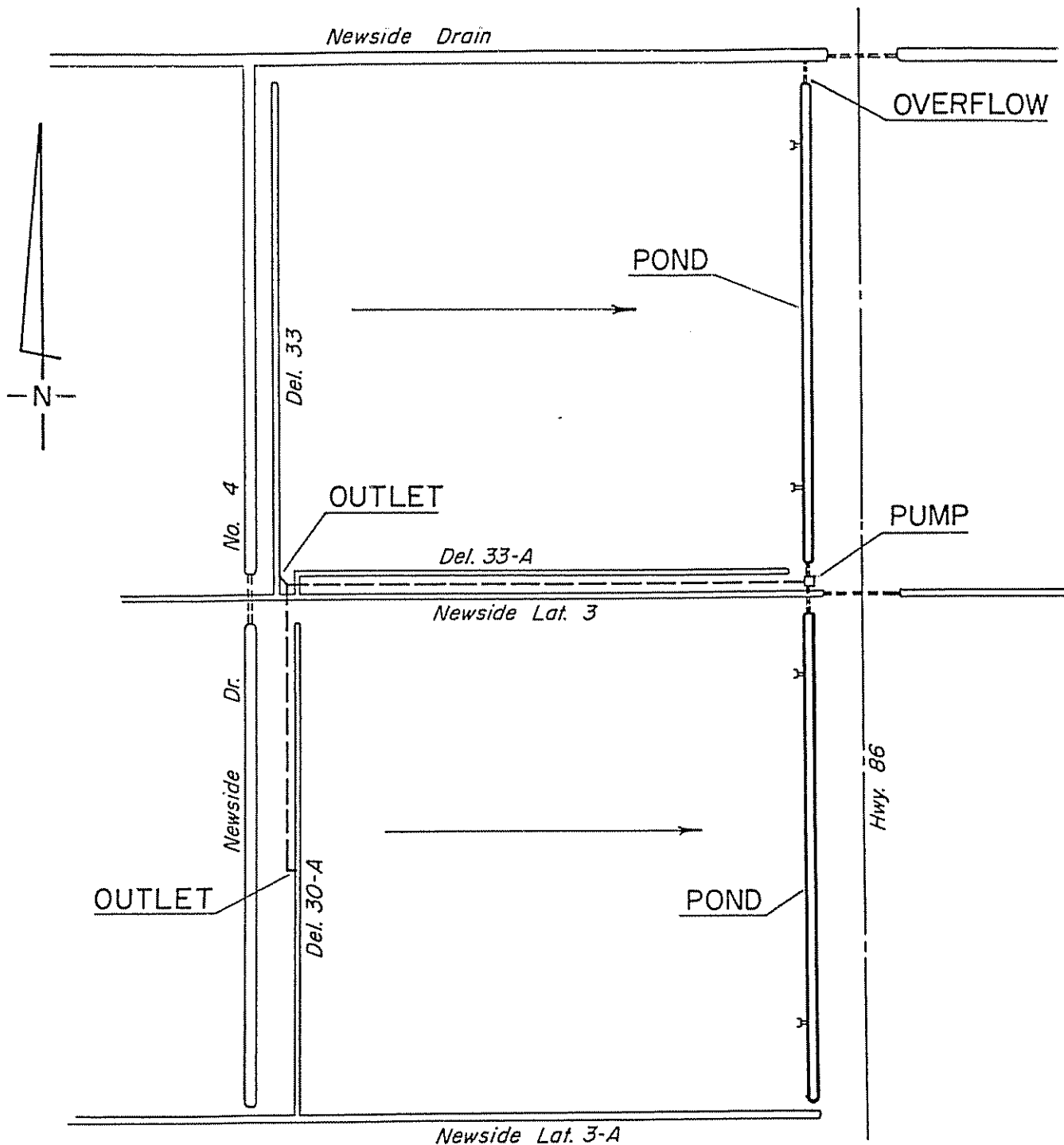
N $\frac{1}{2}$  TRACT 128

T. 13 S. - R. 13 E.



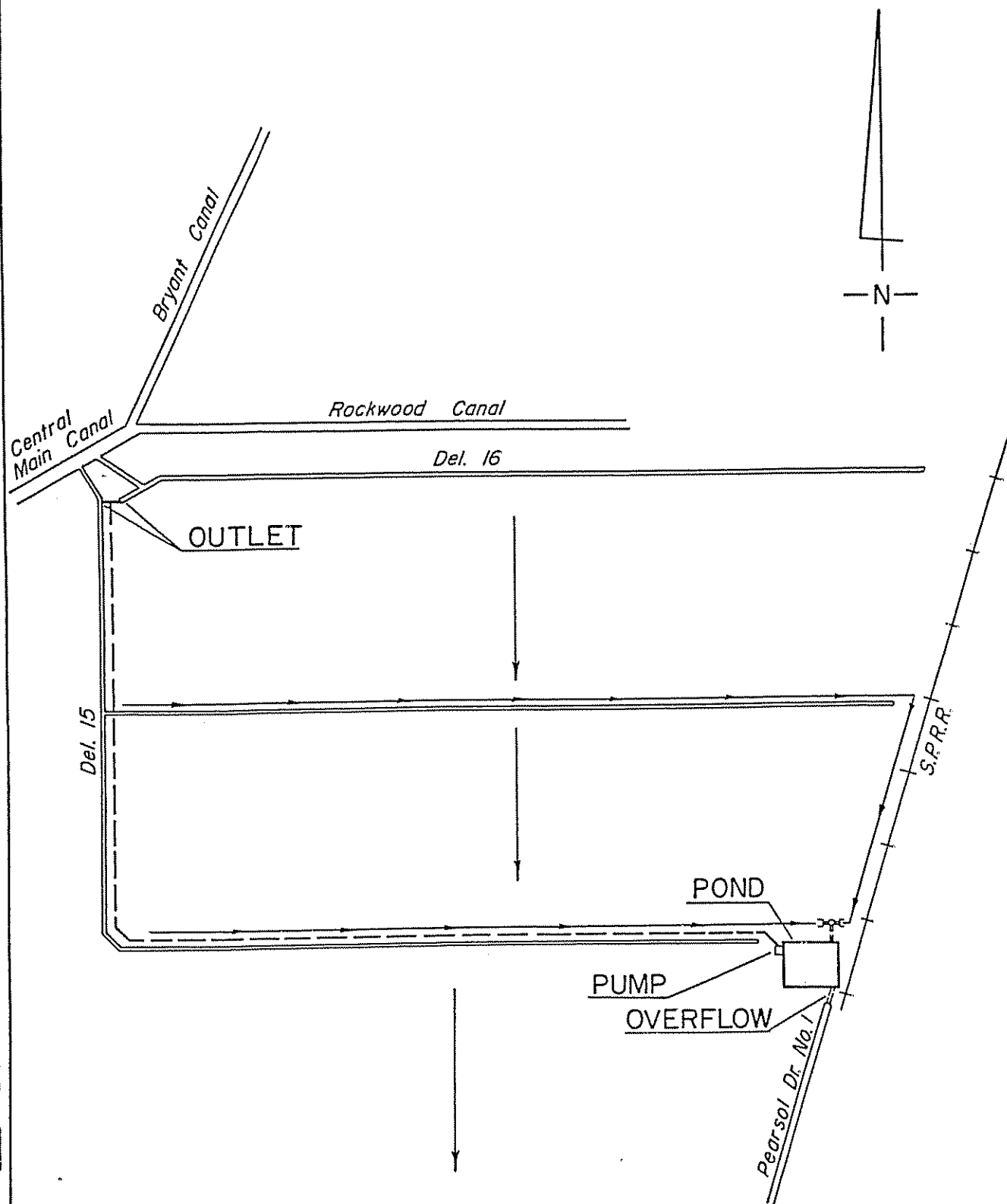
Refer Dwg 12F-6926

NILSON PUMPBACK  
LOTS 1, 2, 4, and 5 SEC. 16  
T. 16 S. - R. 15 E.



Refer Dwg. 12F-6930

VEYSEY PUMPBACK  
 TR.S 65, 177, and 189  
 T. 14 S. - R. 13 E.



Refer Dwg. 12F-6932

# BENSON PUMPBACK

TRACT 117  
T. 14 S. - R. 14 E.

EXHIBIT 8-5

Dwg. L-2886

program is to determine the effectiveness, potential problems and associated costs of tailwater recovery systems on different soils, slopes, crops, etc. Delivery, tailwater, recycled tailwater, water salinity, soil salinity, and temperature are being monitored.

The tailwater recovery systems were designed to capture irrigation water that runs off the low end of the field, store it for a short period of time (hours), and then reapply it to the same field or one nearby.

The pumping units are designed for minimal maintenance. A drainage headwall guides the water into the sump and a 48-inch diameter RCP manhole is used as a sump. Trash pumps with 3-inch solids bypass capacity were installed at all locations. Pump and motor protection has been provided. The discharge line is 12-inch diameter, Class 160 PVC pipe. Excess operational pressures were foreseen. There have been some problems in the operation of the systems. Some have been design-related and so tailwater boxes have been changed to 42-inch. Leakshave occurred due to construction methods and in some cases debris has clogged the line. Operational problems seem to be caused primarily by the operators.

Tailwater salinity appears to be directly related to the salinity of the soil in the field. In general, if the field has a low soil salinity, tailwater from that field will also be low in salinity. If the field has a high soil salinity, the salinity of the

tailwater from that field will be high. As the water travels across the field it picks up salts from the soil. In addition, during the summer the salt in the water is concentrated by evaporation as the water travels across the field. The water temperature also increases. Tailwater temperatures on alfalfa fields have been measured as high as 110°F during the summer. The effects of these higher temperatures have not yet been evaluated.

Over 2,000 soil samples have been gathered from the fields involved in the demonstration tailwater recovery program. These samples are currently being analyzed. Temperature and salinity analyses collected during the year on fields included in the irrigation scheduling programs are listed in Table 20. Table 21 shows the results of tailwater salinity and temperatures for the demonstration tailwater systems.

Table 22 is a summary of the irrigation efficiency achieved by the Veysey system during the first year of operation. Exhibit 9 is a printout from the electronic recorder data for one irrigation on Mr. Veysey's sugar beets served by Delivery 30 (January 3 and 4, 1986) on Newside Lateral 3-A. All of the tailwater (TW) flowing into the pond was pumped back to the field, there was no flow to the drain. For comparison, an average sugar beet field in the Imperial Valley might have 24 percent tailwater (90 AF) for the same time period. If projected for the entire year this would amount to a savings of approximately 1 AF/acre.

TAILWATER SALINITY ANALYSIS

DATE	CROP	DEL/TW/POND	TIME	WATER TEMP	AIR TEMP	ELECTRICAL CONDUCTIVITY
09/30/85	ALFALFA	TAILWATER	08:38	72.0	78.0	1.08
09/30/85	ALFALFA	TAILWATER	01:45	90.0	88.0	1.06
09/30/85	ALFALFA	TAILWATER	09:06	78.0	80.0	1.38
09/30/85	ALFALFA	TAILWATER	01:38	92.0	90.0	1.56
09/30/85	ALFALFA	TAILWATER	09:37	77.0	78.0	1.39
10/05/85	ONIONS	DELIVERY	11:20	70.0	82.0	0.94
10/15/85	ALFALFA	DELIVERY	10:30	66.0	72.0	0.95
10/15/85	ALFALFA	TAILWATER	10:04	66.0	74.0	1.38
10/15/85	ALFALFA	DELIVERY	08:53	65.0	70.0	0.97
10/15/85	ALFALFA	DELIVERY	10:45	70.0	74.0	0.89
10/15/85	ALFALFA	TAILWATER	12:30	76.0	80.0	1.17
10/15/85	ALFALFA	TAILWATER	08:45	60.0	70.0	1.32
10/21/85	ALFALFA	DELIVERY	11:45	73.0	80.0	1.05
10/22/85	ALFALFA	DELIVERY	12:43	72.0	81.0	0.93
10/22/85	ALFALFA	TAILWATER	12:30	83.0	80.0	1.11
10/22/85	ALFALFA	DELIVERY	12:35	71.0	80.0	0.95
10/22/85	ALFALFA	TAILWATER	11:45	80.0	79.0	1.98
10/22/85	ALFALFA	TAILWATER	10:30	68.0	74.0	1.03
10/22/85	ALFALFA	DELIVERY	10:36	69.0	74.0	0.91
10/22/85	ALFALFA	TAILWATER	13:30	76.0	82.0	1.11
10/22/85	ALFALFA	DELIVERY	13:43	72.0	83.0	0.91
10/22/85	ROW ALFALFA	DELIVERY	14:00	58.0	72.0	1.68
10/23/85	ALFALFA	TAILWATER	10:45	74.0	74.0	1.43
10/23/85	ALFALFA	TAILWATER	13:39	82.0	62.0	0.98
10/23/85	ROW ALFALFA	TAILWATER	08:45	58.0	72.0	1.68

TAILWATER SALINITY ANALYSIS

DATE	CROP	DEL/TW/POND	TIME	WATER TEMP	AIR TEMP	ELECTRICAL CONDUCTIVITY
10/28/85	ALFALFA	TAILWATER	09:40	74.0	78.0	1.17
10/28/85	ALFALFA	DELIVERY	11:45	73.0	86.0	0.93
10/28/85	ALFALFA	DELIVERY	09:30	72.0	78.0	0.93
10/28/85	ALFALFA	DELIVERY	11:00	70.0	84.0	0.92
10/28/85	ALFALFA	DELIVERY	08:36	69.0	76.0	0.94
10/28/85	ALFALFA	TAILWATER	08:40	69.0	77.0	1.25
10/28/85	ALFALFA	TAILWATER	08:30	68.0	76.0	1.24
10/28/85	ALFALFA	DELIVERY	11:30	74.0	84.0	0.93
10/29/85	ALFALFA	DELIVERY	12:50	72.0	90.0	0.89
10/29/85	ALFALFA	DELIVERY	01:00	72.0	90.0	0.92
10/29/85	ALFALFA	DELIVERY	10:43	73.0	83.0	0.90
10/29/85	ALFALFA	TAILWATER	10:37	80.0	81.0	1.06
10/29/85	ALFALFA	DELIVERY	11:20	72.0	84.0	0.90
10/29/85	ALFALFA	DELIVERY	12:08	72.0	88.0	0.92
10/29/85	ALFALFA	TAILWATER	11:50	84.0	88.0	1.34
10/29/85	ALFALFA	DELIVERY	10:55	72.0	86.0	0.90
10/29/85	ALFALFA	TAILWATER	09:15	69.0	72.0	1.10
10/29/85	ALFALFA	DELIVERY	11:13	72.0	84.0	0.90
10/29/85	ALFALFA	TAILWATER	10:23	70.0	80.0	1.03
10/30/85	ALFALFA	DELIVERY	11:45	72.0	86.0	0.89
10/30/85	ALFALFA	TAILWATER	11:15	78.0	86.0	0.95
10/30/85	ALFALFA	DELIVERY	02:30	72.0	90.0	0.87
10/30/85	ALFALFA	DELIVERY	02:30	0.0	0.0	0.00
10/30/85	BEETS	DELIVERY	09:11	68.0	79.0	0.87
10/30/85	BEETS	TAILWATER	08:53	65.0	78.0	0.91

DATE	CROP	DEL/TW/POND	TAILWATER SALINITY ANALYSIS		
			TIME	WATER TEMP	AIR ELECTRICAL CONDUCTIVITY
10/30/85	BEETS	DELIVERY	09:47	71.0	80.0 0.95
11/04/85	ALFALFA	DELIVERY	13:00	74.0	83.0 1.54
11/04/85	ALFALFA	DELIVERY	09:23	64.0	76.0 0.97
11/04/85	ONIONS	DELIVERY	09:40	66.0	72.0 0.96
11/04/85	WHEAT	DELIVERY	12:30	66.0	82.0 0.95
11/05/85	ALFALFA	DELIVERY	10:34	68.0	80.0 0.96
11/05/85	ALFALFA	TAILWATER	10:43	70.0	80.0 1.13
11/05/85	ALFALFA	DELIVERY	14:30	70.0	80.0 0.97
11/05/85	WHEAT	DELIVERY	10:00	64.0	76.0 0.99
11/06/85	BERMUDA GRASS	TAILWATER	14:25	82.0	62.0 1.46
11/06/85	BERMUDA GRASS	TAILWATER	14:30	82.0	62.0 1.72
11/06/85	ROW ALFALFA	TAILWATER	10:39	58.0	52.0 1.14
11/12/85	ALFALFA	TAILWATER	10:57	58.0	50.0 1.75
11/12/85	ALFALFA	TAILWATER	12:57	66.0	54.0 1.18
11/12/85	ALFALFA GERM.	DELIVERY	13:24	62.0	65.0 0.93
11/12/85	ALFALFA GERM.	TAILWATER	13:19	68.0	73.0 1.31
11/12/85	ONIONS	TAILWATER	13:02	64.0	52.0 1.20
11/12/85	RAPE	TAILWATER	14:38	58.0	52.0 1.28
11/12/85	ROW ALFALFA	TAILWATER	12:31	62.0	51.0 1.38
11/12/85	ROW ALFALFA	DELIVERY	13:40	61.0	64.0 0.89
11/12/85	SUGAR BEETS	TAILWATER	13:31	65.0	67.0 1.81
11/12/85	SUGAR BEETS	DELIVERY	13:35	56.0	66.0 1.33
11/13/85	ALFALFA	TAILWATER	13:10	64.0	68.0 0.99
11/13/85	ALFALFA	DELIVERY	13:18	68.0	68.0 0.87
11/13/85	ALFALFA	TAILWATER	13:10	64.0	68.0 0.99

TAILWATER SALINITY ANALYSIS			
DATE	CROP	DEL/TW/POND	TIME WATER AIR ELECTRICAL TEMP TEMP CONDUCTIVITY
11/13/85	ALFALFA	DELIVERY	13:18 68.0 68.0 0.87
11/18/85	ALFALFA	DELIVERY	13:00 60.0 70.0 0.95
11/18/85	ALFALFA	DELIVERY	10:40 58.0 70.0 0.97
11/18/85	ALFALFA	DELIVERY	10:45 58.0 70.0 1.01
11/18/85	MULCH H2O WHEAT	DELIVERY	13:35 60.0 70.0 0.88
11/21/85	ALFALFA	TAILWATER	12:35 58.0 72.0 0.88
11/21/85	SUGAR BEETS	DELIVERY	12:10 59.0 72.0 0.91
12/31/85	ALFALFA	DELIVERY	12:00 56.0 68.0 0.93
01/01/86	BEETS	TAILWATER	12:30 61.0 78.0 1.65
01/03/86	ALFALFA	DELIVERY	12:45 61.0 78.0 1.06
01/03/86	ALFALFA	TAILWATER	12:36 72.0 78.0 1.27
01/04/86	ALFALFA	DELIVERY	08:35 57.2 62.6 0.90
01/04/86	ALFALFA	TAILWATER	08:09 53.2 57.2 0.97
01/04/86	ALFALFA	POND	08:24 53.0 59.0 1.13
01/04/86	BEETS	TAILWATER	09:54 58.0 68.0 1.57
01/04/86	BEETS	DELIVERY	10:05 58.0 64.4 0.87
01/04/86	BEETS	POND	10:17 58.0 69.0 1.62
02/05/86	ROW ALFALFA	TAILWATER	08:25 48.0 58.0 0.93
02/05/86	ROW ALFALFA	DELIVERY	08:30 53.0 58.0 0.99
03/07/86	ALFALFA	TAILWATER	09:48 65.0 78.0 1.22
03/07/86	ALFALFA	POND	10:00 65.0 64.0 0.94
03/07/86	ALFALFA	DELIVERY	09:35 68.0 78.0 1.02
03/14/86	SUGAR BEETS	TAILWATER	15:45 62.0 78.0 0.00
03/28/86	SUGAR BEETS	POND	09:15 66.0 75.0 1.66
03/28/86	SUGAR BEETS	TAILWATER	09:05 68.0 75.0 1.85

TAILWATER SALINITY ANALYSIS

DATE	CROP	DEL/TW/POND	TIME	WATER TEMP	AIR TEMP	ELECTRICAL CONDUCTIVITY
03/28/86	SUGAR BEETS	DELIVERY	08:58	67.0	75.0	0.87
04/03/86	WHEAT	DELIVERY	10:20	68.0	73.4	0.88
04/03/86	WHEAT	TAILWATER	14:33	77.0	80.1	1.09
04/03/86	WHEAT	POND	14:37	78.0	80.1	1.24
04/08/86	AWHEAT	DELIVERY	08:19	64.0	71.0	0.86
04/08/86	WHEAT	DELIVERY	13:05	62.0	78.0	0.96
04/08/86	WHEAT	TAILWATER	09:00	63.0	66.0	0.94
04/08/86	WHEAT	TAILWATER	09:08	64.0	67.0	0.96
04/09/86	ALFALFA	TAILWATER	13:10	66.0	84.0	0.92
04/09/86	ALFALFA	DELIVERY	13:13	66.0	84.0	0.90
04/09/86	ALFALFA	TAILWATER	13:00	66.0	84.0	0.94
04/09/86	ALFALFA	TAILWATER	10:13	63.0	86.0	1.02
11/05/86	ALFALFA	TAILWATER	12:25	78.0	84.0	1.11
12/31/86	✓	TAILWATER	12:50	58.0	69.0	1.11
12/31/86	✓	DELIVERY	12:40	56.0	69.0	0.96

TAILWATER RETURN SYSTEMS  
TAILWATER SALINITY ANALYSIS

DATE	LOCATION	DEL/TW/POND	TIME	CROP	WATER TEMP	AIR TEMP	ELECTRICAL CONDUCTIVITY
04/03/86	CENTRAL MAIN 15	DELIVERY	10:20	WHEAT	68.0	73.4	0.88
04/03/86	CENTRAL MAIN 15	POND	14:37	WHEAT	78.0	80.1	1.24
04/03/86	CENTRAL MAIN 15	TAILWATER	14:33	WHEAT	77.0	80.1	1.09
12/31/86	CENTRAL MAIN 15	DELIVERY	12:40		56.0	69.0	0.96
12/31/86	CENTRAL MAIN 15	TAILWATER	12:50		58.0	69.0	1.11
01/04/86	NEWSIDE 30-A	DELIVERY	10:05	SUGAR BEETS	58.0	64.4	0.87
01/04/86	NEWSIDE 30-A	POND	10:17	SUGAR BEETS	58.0	69.0	1.62
01/04/86	NEWSIDE 30-A	TAILWATER	09:54	SUGAR BEETS	58.0	68.0	1.57
03/28/86	NEWSIDE 30-A	DELIVERY	08:58	SUGAR BEETS	67.0	75.0	0.87
03/28/86	NEWSIDE 30-A	POND	09:15	SUGAR BEETS	66.0	75.0	1.66
03/28/86	NEWSIDE 30-A	TAILWATER	09:05	SUGAR BEETS	68.0	75.0	1.85
11/12/85	NEWSIDE 33	DELIVERY	13:35	SUGAR BEETS	56.0	66.0	1.33
11/12/85	NEWSIDE 33	TAILWATER	13:31	SUGAR BEETS	65.0	67.0	1.81
01/01/86	NEWSIDE 33	TAILWATER	12:30	SUGAR BEETS	61.0	78.0	1.65
03/14/86	NEWSIDE 33	TAILWATER	15:45	SUGAR BEETS	62.0	78.0	1.42
01/04/86	Q-15	DELIVERY	08:35	ALFALFA	57.2	62.6	0.90
01/04/86	Q-15	POND	08:24	ALFALFA	53.0	59.0	1.13
01/04/86	Q-15	TAILWATER	08:09	ALFALFA	53.2	57.2	0.97
03/07/86	Q-15	DELIVERY	09:35	ALFALFA	68.0	78.0	1.02
03/07/86	Q-15	POND	10:00	ALFALFA	65.0	64.0	0.94
03/07/86	Q-15	TAILWATER	09:48	ALFALFA	65.0	78.0	1.22
01/09/86	TRIFOLIUM 8 - 153	DELIVERY	10:10	ALFALFA	56.0	68.0	0.91
01/09/86	TRIFOLIUM 8 - 153	TAILWATER	10:20	ALFALFA	53.0	60.0	0.95

# VEYSEY TAILWATER RECOVERY SYSTEM

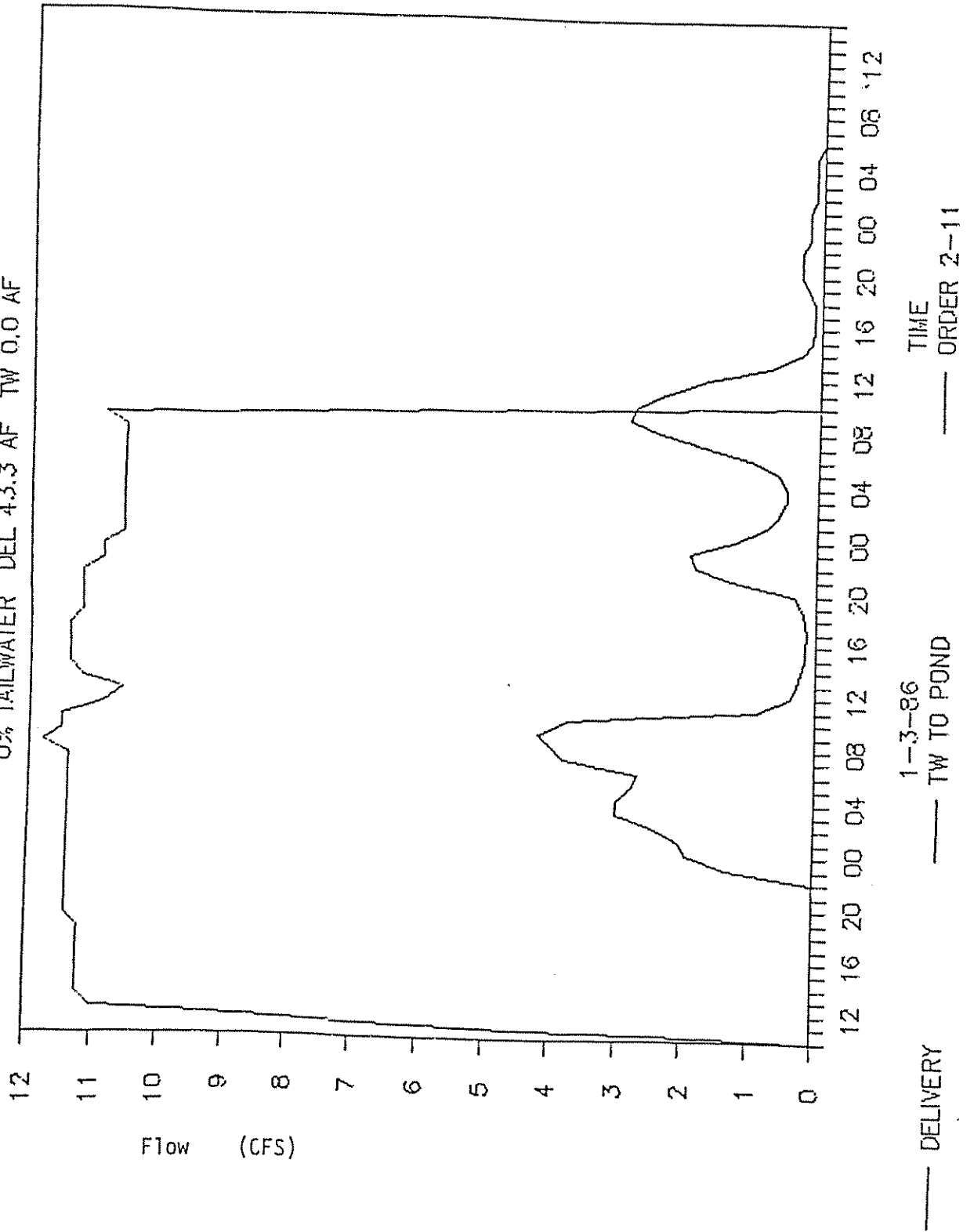
DATE	DELIVERY AC FT	TAILWATER AC FT	RECYCLED AC FT	TAILWATER PERCENT
11-10-85	42.9	1.3	5.0	3.0
01-03-86	43.3	0.0	4.6	0.0
01-07-86	5.2	0.0	2.0	0.0
01-10-86	42.4	0.0	13.0	0.0
02-03-86	60.2	0.2	13.0	0.3
02-26-86	55.4	0.0	13.3	0.0
03-12-86	57.0	0.9	13.5	1.6
03-27-86	72.5	0.0	13.1	0.0
TOTAL-AVG	378.9	2.4	77.5	0.1

4960 KW X .0484 = \$240.06

\$240.06 / 77.5 AC-FT = \$3.10 PER AC-FT PUMPED BACK

# NEWSIDE 30A PUMPBACK

0% TAILWATER DEL 43.3 AF TW 0.0 AF



IMPERIAL VALLEY PRESS - APRIL 8, 1986

## IMPERIAL IRRIGATION DISTRICT PUMPBACK FIELD DAY

Thursday, April 10, 1986  
11:00 a.m.

Location: 1/2 mile south of Keystone Road  
on Highway 86, across from Holly Sugar

Discussion will include: Cost and  
operation of system, temperature  
and salinity analysis, and amount of  
irrigation water conserved.

## IMPERIAL IRRIGATION DISTRICT



*"Facing The Future . . . Proud of Our Past"*

A field day, sponsored by the District, was held at the Veysey Ranch on April 10, 1986. A copy of the public notice is shown in Exhibit 10.

A review of the favorable results obtained were presented along with a complete demonstration of the system.

#### 4.13 SUMMARY

Current IID Water Conservation Activities emphasize thorough planning. This will allow the development of a comprehensive plan that takes into account:

- 1) Economic viability;
- 2) Environmental concerns;
- 3) Legal constraints;
- 4) Technical feasibility.

In developing general policy, special studies and field implementation plans, a careful balance must be maintained between these factors. IID recognizes the need to implement a full scale water conservation program, but consideration will be given to providing a plan that allows the orderly upgrading of the system. Service to water users cannot be compromised by physical impairment of the distribution system or economic instability of the Imperial Irrigation District.